

Seddon, Eleanor (2018) *The epidemiology of head injury in women in Scottish prisons*. D Clin Psy thesis.

<https://theses.gla.ac.uk/30920/>

Copyright and moral rights for this work are retained by the author

A copy can be downloaded for personal non-commercial research or study, without prior permission or charge

This work cannot be reproduced or quoted extensively from without first obtaining permission in writing from the author

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the author

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given

Enlighten: Theses

<https://theses.gla.ac.uk/>  
[research-enlighten@glasgow.ac.uk](mailto:research-enlighten@glasgow.ac.uk)



University  
of Glasgow

# The Epidemiology of Head Injury in Women in Scottish Prisons

*& Clinical Research Portfolio*

Eleanor Seddon  
(*MA Hons*)

Submitted in partial fulfilment of the requirements for the degree of  
Doctorate in Clinical Psychology

Institute of Health and Wellbeing  
College of Medical, Veterinary and Life Sciences  
University of Glasgow

September 2018

## Table of Contents

Acknowledgements .....	4
------------------------	---

### **Systematic Review**

Abstract .....	6
Introduction .....	7
Methods .....	10
Results .....	16
Discussion .....	26
References.....	35

### **Major Research Project**

Plain English Summary .....	41
Abstract .....	45
Introduction .....	46
Methods .....	50
Results .....	55
Discussion .....	69
References.....	76

## Appendices

### Systematic Review Appendices

Appendix 1.1: Author guidelines for submission to The Journal of Forensic Psychiatry & Psychology.....	81
Appendix 1.2: Database Search Strategies.....	85

### Major Research Project Appendices

Appendix 2.1: Author guidelines for submission to Journal of Head Trauma Rehabilitation.....	90
Appendix 2.2: Letter of ethical approval from NHS.....	96
Appendix 2.3: SPS ethical approval.....	100
Appendix 2.4: Measures completed to support parallel research study.....	101
Appendix 2.5: Participant recruitment poster.....	103
Appendix 2.6: Participant information sheet.....	104
Appendix 2.7: Participant Consent Form.....	109
Appendix 2.8: Letter to healthcare professional.....	110
Appendix 2.9: Ohio State University TBI Identification Method.....	111
Appendix 2.10: Adapted Traumatic Life Events Questionnaire.....	113
Appendix 2.11: Data Capture Form.....	118
Appendix 2.12: Physical and mental health of the sample.....	122
Appendix 2.13: Research Proposal and proposal appendices.....	124

### **Acknowledgements**

I would like to express my thanks to all the women who participated in the study. Your strength and resilience is inspiring and something that I will take with me throughout my career. The staff at HMP Greenock, HMP Cornton Vale and HMP Edinburgh do an incredible job and I thank you for your all your assistance with the project. Thank you also to Jenny McGhie, at the Maria Henderson Library- your patience, knowledge and guidance has been very much appreciated.

To my supervisor Professor Tom McMillan, thank you so much for your enormous support throughout the project. It has been a privilege to work with you and to learn from someone who has achieved so much in their career. Thank you to Eimear Crowe and Hira Aslam for all your work on the project.

Thank you also to Dr Caroline Bruce for your guidance, particularly in relation to my systematic review. Your reading recommendations and knowledge of trauma and the legal system has been incredibly helpful for the project and my development as a clinician.

I would like to express my sincerest thanks to all my wonderful friends and classmates on the course. I believe I have made friends for life. I feel privileged to have gone through this journey with you and cannot thank you enough for all your support.

Thank you to my family and friends outside the course for your emotional and practical support. I look forward to being able to spend more time with you again!

Lastly and most importantly, to my fiancé, Chris, I could not have got through these last three years without your unending support, humour and love. You are the love of my life and I can't wait to marry you.

## Chapter One: Systematic Review

### Are Complex Trauma Experiences associated with Characteristics of Offending in Women in Prison?

Eleanor Seddon<sup>1</sup>

*<sup>1</sup>Address for Correspondence*

Institute of Health and Wellbeing  
College of Veterinary, Medical and Life sciences  
University of Glasgow  
1st Floor, Administrative Building  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow  
G12 0XH

ORCID: 0000-0003-3756-4531

Chapter word count: 7106

Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology. Prepared in accordance with the guidelines for submission to The Journal of Forensic Psychiatry & Psychology (See Appendix 1.1).

## **Abstract**

### **Background**

Women in prison (WiP) are more likely to experience complex trauma and victimisation into adulthood than men, such as through intimate partner violence (IPV). No systematic review has synthesised research on the impact of complex trauma on offending.

### **Methods**

Databases and references of key papers were searched for relevant research (CINAHL, PsycINFO, Medline, Embase, PILOTS and OpenGrey). Included papers were assessed for risk of bias.

### **Results**

Six studies were included. Risk of bias and heterogeneity amongst studies was high. Only two papers measured adulthood trauma. WiP who experienced childhood trauma offended at earlier ages and committed more serious offences. Childhood physical and sexual abuse were most commonly associated with offending. Substance use and adulthood trauma were mediators of offending.

### **Conclusions**

Complex trauma experiences were linked to increased risk of offending. Further research should be undertaken cross-referencing self-reported offending with criminal records, and measuring confounders and mediators, such as brain injury and substance use. Studies should measure adulthood trauma given high rates of IPV. Development of complex trauma interventions for WiP is recommended to address offending risk.

**Keywords:** Systematic Review, female offenders, psychological trauma

## **Introduction**

Trauma is highly prevalent in prisoner populations and is linked to increased risk of substance use, antisocial behaviour and offending (Egeressy, Butler, & Hunter, 2009). A recent meta-analysis established that prevalence of post-traumatic stress disorder (PTSD) in women in prison (WiP) is over three times that seen in men in prison (Baranyi, Cassidy, Fazel, Priebe, & Mundt, 2018). WiP have unique needs often overlooked by research on offending (Fazel, Hayes, Bartellas, Clerici, & Trestman, 2016). They are more likely than men to have experienced childhood trauma and are frequently victimised into adulthood, such as intimate partner violence (IPV) (Moloney, van den Bergh, & Moller, 2009).

### **Definition of Complex Trauma**

Complex traumas are interpersonal traumatic experiences occurring repeatedly or for prolonged periods. Typically, the individual cannot escape due to various 'physical, psychological, maturational, family/environmental or social constraints' (Cloitre, 2012, p. 4). Examples include child abuse, IPV, and slavery. Complex trauma can lead to Complex PTSD (cPTSD), which encompasses symptoms of re-experiencing; avoidance; hyperarousal; pervasive difficulties related to self-organisation, such as emotional dysregulation; negative self-concept; and relationship difficulties (Herman, 1992; Karatzias, Cloitre, et al., 2017).

It is hypothesised that women's pathways to crime are linked to survival of complex trauma, poverty and substance use (Bloom, Owen, & Covington, 2004).



However, the mechanisms and pathways between complex trauma and offending are unclear (Karatzias, Power, et al., 2017b).

Single papers show that women who have experienced complex trauma are more likely to commit crime at an earlier age (Messina & Grella, 2006) and with a higher severity (Karatzias, Power, et al., 2017) however no systematic review has synthesised the research on the relationship between complex trauma and offending behaviour. Reviewing the literature on the relationship between complex trauma and offending in WiP would increase understanding of this vulnerable population. It is hypothesised that complex trauma will be associated with earlier onset and higher severity of offending. There are difficulties in measuring severity of offending across studies because it can be defined in a number of ways. Characteristics of offending such as earlier age at first offence, type of offence, sentence length and time in prison are all ways of describing severity of offending (Kenny & Press, 2006; Torok, Darke, Shande & Kaye, 2014). However, no previous systematic review has researched which characteristics of offending may be more affected by complex trauma experiences.

The timing of complex traumatic events may also be an important factor in the impact on offending. It is hypothesised that childhood trauma experiences may have a higher impact on offending due to its potential effect on attachment style and neurodevelopment (Courtois, 2008). Complex childhood trauma has been shown to lead to alterations in the stress response systems of the brain (Perry, 2006). This can lead to emotional dysregulation, which is likely to increase risk of offending both directly through problems with aggression and difficulty trusting others, and indirectly, through coping strategies for emotional

distress, such as substance use, increasing impulsivity, disinhibition and aggression (Brewer-Smyth, Wolbert Burgess & Shults, 2004). The Good Lives Model is a model for understanding offending behaviour and hypothesises that offending occurs in the context of individuals' seeking 'primary goods'. These are factors such as friendship, mastery and agency in maladaptive ways (Barnao, Ward & Robertson, 2016). Taking a Good Lives Model approach, individuals who have experienced complex trauma may be more vulnerable to commit offences as a means of achieving these primary goods because of sequelae of complex trauma limiting their ability to achieve these goods in an adaptive way. Sequelae of complex trauma such as difficulty forming trusting relationships with others; difficulty self-soothing when experiencing distress; and hyperarousal may affect individuals' abilities to achieve these primary goods (Courtois, 2008).

Understanding how complex trauma affects offending presents an opportunity to develop trauma-informed interventions for WiP. As well as reducing recidivism, understanding WiP's needs could support their management in prison.

Understanding epidemiology of trauma in prisoners, and its link to offending, could inform trauma and offending-informed interventions at a population level for people who have experienced complex trauma.

### **Research Questions**

1. What characteristics of offending (such as age of first offence, length of prison sentence and violent offending) are linked to complex trauma?
2. Does the timing or type of complex trauma impact on offending?
3. Are there any mediators of the link between complex trauma and offending?

### Methods

This systematic review was conducted following Meta-analysis of Observational studies in Epidemiology guidelines (Stroup et al., 2000) and the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) (Moher, Liberati, Tetzlaff, & Altman, 2009).

### Search Strategy

The following databases were searched on 27<sup>th</sup> June 2018 using a combination of relevant keywords and subject headings: CINAHL, PsycINFO, Medline, Embase, PILOTS (exclusively trauma literature database), and Open Grey (grey literature). References of key papers were searched and key authors were contacted to uncover any further articles or unpublished data. A combination of the following search terms were developed, in consultation with a librarian, to identify relevant papers published between 1950 and 27<sup>th</sup> June 2018:

1. ((women or woman or female\*) adj2 (arrest\* or delinquen\* or inmate\* or incarcerat\* or perp\* or crim\* or prison\* or imprison\* or offend\* or remand\* or correctional or probat\* or penitentiary\* or recidivism or reoffend\* or re-offend\* or homicid\* or jail\* or Gaol\*)).ti,ab,kw.
2. ((child\* adj2 (neglect\* or abus\* or trauma\* or maltreat\*)) or (adverse adj2 experience\*)).ti,ab,kw.
3. partner violence/ or battered woman/ or slavery/ or human trafficking/ or torture/ or rape/ or acquaintance rape/ or attempted rape/ or marital rape/ or hostage/ or emotional abuse/ or sexual abuse/ or psychosocial disorder/ or borderline state/ or child abuse/ or domestic violence/ or child abuse survivor/ or child neglect/ or child sexual abuse/ or posttraumatic stress disorder/ or psychotrauma

4. (victimi\* or rape\* or ((physical\* or emotional\* or sex\* or partner\* or intimate or domestic or multiple or chronic or gender\* or histor\*) adj2 (abus\* or violen\* or trauma\*)) or hostage\* or prostitut\* or slave\* or torture\* or traffick\* or refugee\*).ti,ab,kw.
5. (PTSD or "post traumatic stress disorder" or "posttraumatic stress disorder" or CPTSD or "developmental trauma" or "complex trauma\*" or DESNOS or "extreme stress" or "dissociative disorder" or BPD or "borderline personality" or (emotion\* adj2 dysregulat\*)).ti,ab,kw.
6. S1 AND (S2 OR S3 OR S4 OR S5)

For full search strategy for various databases see Appendix 1.2. The search and selection process was not checked by a second rater.

### **Inclusion and Exclusion Criteria**

Studies were eligible for inclusion if they met the following criteria:

1. Results include breakdown by gender or paper is solely based on women.
2. Adult prison population (Age 18 years or over).
3. Use of a validated measure of traumatic life events exposure that includes complex trauma, or an adapted version of a validated measure.
4. Data on offending characteristics provided.
5. The paper made attempts to investigate the relationship between trauma exposure and offending characteristics.

Studies were excluded if they did not meet inclusion criteria, or if they were review papers, dissertations or books. Unfortunately, financial constraints did

not allow for the translation of articles so articles not written in English were excluded. Relevant authors (n=5) were contacted for potential unpublished data if no data on the relationship between offending behaviour and trauma was provided in the article.

### **Search Results**

Following removal of duplicates, the search identified 9042 articles. Titles and abstracts were screened for eligibility, which excluded 9007 articles. Thirty-five articles were assessed for eligibility by reading the full text. Following this, six articles were identified as meeting all inclusion criteria. Figure 1 details the search strategy process and reasons for exclusion.

One reviewer extracted the data using a standardised form developed for this review.

### **Risk of Bias Assessment**

In line with The Cochrane Collaboration (2011) guidance on systematic reviews, a risk of bias tool was developed for this review with reference to the research questions. Criteria used were adapted from those in Sanderson et al (2007)'s paper on observational tools in epidemiological studies and Moynan and McMillan's (2018) tool for review of prevalence of head injury in offenders. Domains could be rated as 'high' or 'low' in risk of bias depending on whether they met criteria in the risk of bias tool (see Table 1 for criteria). If domains were not relevant to the study they were rated as 'not applicable' (N/A). Articles were rated independently in each domain by 2 raters. Agreement between raters on risk of bias ratings was 91%. Discrepancies in ratings were resolved by discussion.

Table 1:

*Risk of Bias Domains and Criteria*

Domain	Criteria
1. Selection bias	<ul style="list-style-type: none"> <li>i. inclusion/exclusion criteria clearly stated</li> <li>ii. Representative sample- Sample should be demographically representative of larger female offender population from which sample is taken</li> </ul>
2. Attrition bias	State clearly if and why any participants excluded from analyses
3. Design specific bias	Discussion of and appropriate methods outlined to deal with any design-specific issues such as interviewer bias.
4. Methods for measuring trauma exposure: 4.1 In childhood 4.2 In adulthood	<ul style="list-style-type: none"> <li>i. Measurement of trauma includes measures of events that meet internationally recognised Type 2 complex trauma definition (Herman (2015): 'interpersonal trauma that occurs in a prolonged, repeated manner from which the individual cannot escape e.g. child abuse, domestic abuse, war, slavery/torture'</li> <li>ii. Use of a validated scale of trauma exposure or adapted version of validated scale (state clearly what was adapted). Scale validated for use in prison population.</li> </ul>
5. Methods for measuring trauma severity	Validated measure of severity or cumulative nature of trauma exposure that: <ul style="list-style-type: none"> <li>i. assesses frequency of exposure,</li> <li>ii. examines adulthood and childhood trauma</li> <li>iii. Assesses more than one type of trauma</li> </ul>
6. Methods for defining and measuring offending behaviour	Offending behaviour- definition clearly stated. If exploring violent offending - definition of violent versus nonviolent crime clearly stated. Examples of characteristics of offending to be measured include (but not limited to): <ul style="list-style-type: none"> <li>i. age at first offence,</li> <li>ii. type of offending,</li> <li>iii. number of convictions,</li> <li>iv. sentence length</li> </ul>

	<ul style="list-style-type: none"> <li>v. length of sentence served to date</li> </ul> Use of criminal records plus self-report is preferable
<b>7. Methods to control confounding</b>	Clear description of any other variables being assessed that may impact on offending behaviour (including but not limited to): <ul style="list-style-type: none"> <li>i. social deprivation</li> <li>ii. substance use</li> <li>iii. mental health problems</li> </ul>
	Was self-report cross-referenced with hospital/prison records to account for over/under reporting?
<b>8. Design and analysis plan</b>	<ul style="list-style-type: none"> <li>i. Statistical analysis of relationship between complex traumas and offending behaviour characteristics.</li> <li>ii. Analysis is appropriate to the design and accounts for confounding variables</li> <li>iii. Are effect sizes reported where appropriate?</li> </ul>
<b>9. Conflicts of interest</b>	Declarations of conflict of interest or identification of funding sources

### Strategy for Combining the Results of the Study

Given the clinical and methodological heterogeneity of included papers, results of the studies were analysed qualitatively. Effect sizes were not reported consistently, which prevented use of meta-analysis.

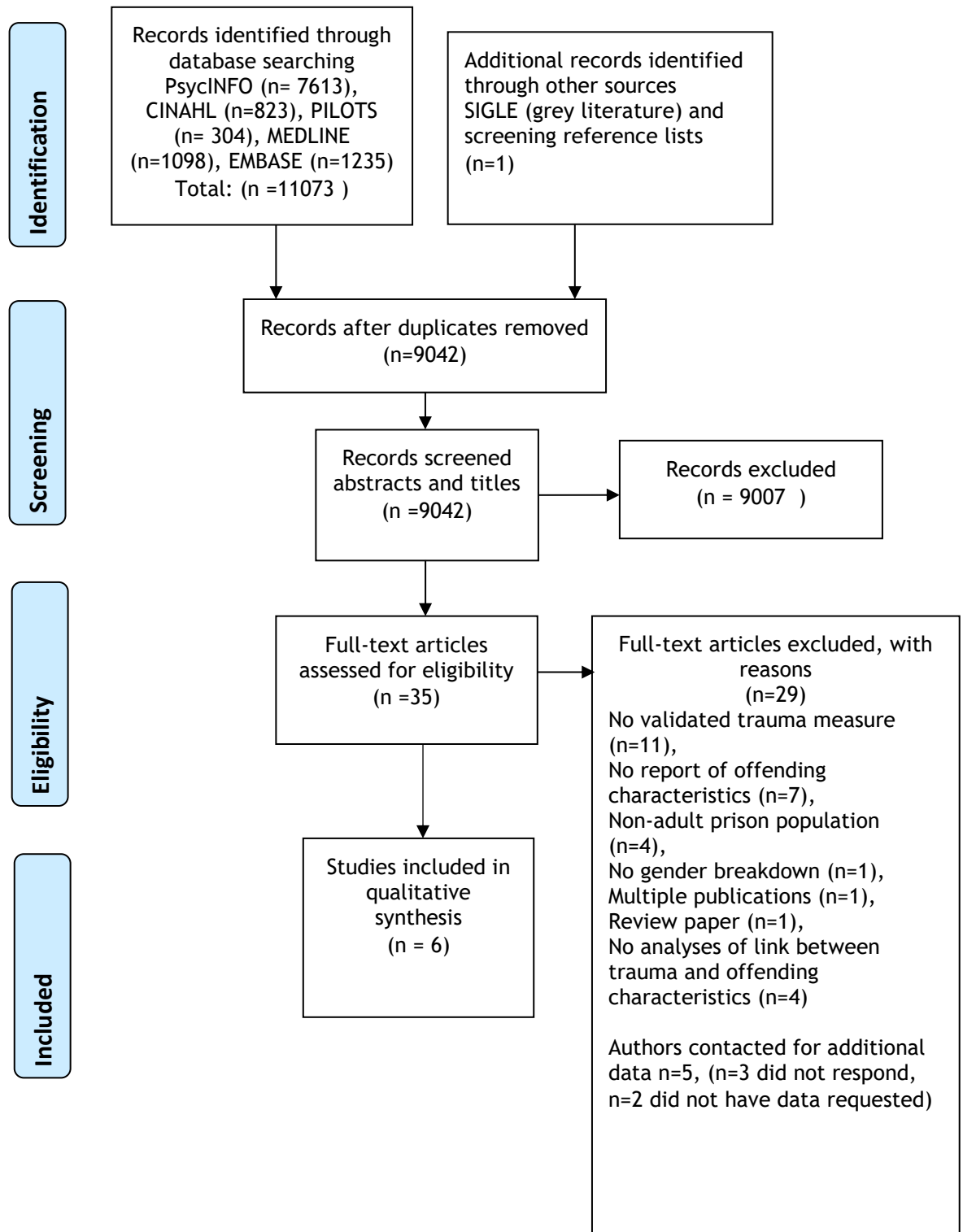


Figure 1: PRISMA (2009) Flow Diagram



## Results

### Study Characteristics

Six studies met all inclusion criteria, with a total of 1172 WiP in the studies. The average age of participants in the six papers was 34.9 years ( $SD=5.82$ ). Four of the papers were samples from the USA. All papers used a cross-sectional design. Two studies were samples from a substance-abusing population of WiP (Grella, Stein, & Greenwell, 2005; Messina, Grella, Burdon, & Prendergast, 2007). Four of the papers were exclusively samples of WiP and two assessed women and men in prison. Driessen et al. (2006) provided a gender breakdown of trauma exposure and offending characteristics but did not report a gender breakdown of analyses assessing the relationship between these variables. However, they reported statistical analyses showing no effect of gender and were therefore included in the review. Table 3 summarises the papers included in the review.

### Risk of Bias

In terms of research questions, risk of bias was high for three domains, low for two domains and mixed for five domains (See Table 2). Risk of bias was lowest for methods of measuring childhood trauma exposure, with all papers apart from one (Byrd & Davis, 2009) using a validated self-report scale. Risk of bias was highest for design specific bias, measures of offending behaviour and selection methods.

## **Research question 1: What Characteristics of Offending Are Linked to Complex Trauma?**

### **Methods of reporting trauma exposure.**

Risk of bias was mixed for methods of reporting trauma exposure, which led to difficulty in quantitative synthesis of prevalence rates. The most common complex traumas measured and reported were childhood sexual abuse and childhood physical abuse. One paper (Byrd & Davis, 2009) reported physical and sexual assault but did not differentiate between childhood and adulthood trauma. Prevalence of sexual abuse ranged from 31.7% to 75%. Only two papers provided any measure of adulthood trauma exposure (Byrd & Davis, 2009; Karatzias et al., 2017).

### **Methods of reporting trauma severity.**

Methods of assessing and reporting trauma severity varied. Two papers summed a total score for 'number of traumatic events' (Karatzias et al., 2017; Messina et al., 2007). Grella et al. (2005) asked participants (1) how upsetting the event was at the time, (2) whether they experienced helplessness or horror and (3) if they believed someone would be killed or seriously harmed. Two papers (Driessen et al., 2006; Brewer-Smyth et al., 2004) assessed severity by asking how frequently each event occurred on Likert scales.

### **Methods of reporting offending characteristics.**

Only two studies explored criminal records (Driessen et al., 2006; Brewer-Smyth et al., 2004) and Driessen et al (2006) only provided current offence rather than lifetime offences. Three studies used self-reported criminal behaviour (Karatzias et al, 2017; Messina et al., 2007; Grella et al. 2005) and one study (Byrd & Davis,

2009) used a physical assault scale of violent behaviour and self-report of criminal behaviour. Consequently, all studies are rated as high risk of bias for measures of offending behaviour due to relying exclusively on self-report or only measuring recent offending.

### **Link between trauma and offending characteristics.**

#### *Age at first offence.*

Three papers explored the relationship between childhood trauma and age at first offence (Karatzias et al., 2017; Messina et al., 2007; Driessen et al., 2006).

#### *Time in prison.*

Indices of time in prison were mixed, varying from sentence length (Karatzias et al., 2017), lifetime months of imprisonment (Driessen et al., 2006) and number of times in prison (Messina et al., 2007).

#### *Offence type.*

Four papers measured the impact of trauma exposure on type of offending, however methods of measuring offending varied (Byrd & Davis, 2009; Brewer-Smyth et al., 2004; Grella et al., 2005, Driessen et al. 2006).

### **Research question 2: Does the timing or type of complex trauma impact on offending?**

#### **Type of Trauma.**

Only two papers provided a breakdown of the influence of different trauma types on offending (Grella et al., 2005; Byrd & Davis 2009) and the trauma types comparable across papers were limited to sexual and physical abuse.

**Timing of Trauma.**

Two papers discussed childhood versus adulthood trauma's impact on offending (Byrd & Davis 2009; Karatzias et al., 2017).

**Research Question 3: Are there any Mediators of the Link between Complex Trauma and Offending?**

Two papers explored mediators between trauma exposure and offending (Karatzias et al., 2017; Grella et al., 2005) and a further two explored variables that might impact on offending but did not include these in regression analyses to confirm if they acted as mediators between complex and offending behaviour (Messina et al., 2007; Brewer-Smyth et al., 2004).

Table 2:

*Risk of bias ratings*

	Selection bias	Attrition bias	Design specific bias	Method for measuring childhood trauma exposure	Methods for assessing adulthood trauma exposure	Methods for measuring trauma severity	Defining and measuring offending behaviour	Methods to control confounding	Design and analysis plan	Conflicts of interest
1. Brewer-Smyth et al. (2004)	HIGH	LOW	LOW	LOW	N/A	LOW	HIGH	LOW	LOW	LOW
2. Grella et al. (2005)	HIGH	LOW	HIGH	LOW	N/A	HIGH	HIGH	LOW	LOW	LOW
3. Driessen et al. (2006)	LOW	LOW	HIGH	LOW	N/A	LOW	HIGH	HIGH	LOW	LOW
4. Messina et al. (2007)	HIGH	HIGH	HIGH	LOW	N/A	LOW	HIGH	HIGH	HIGH	LOW
5. Byrd & Davis (2009)	LOW	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	LOW
6. Karatzias et al. (2017b)	HIGH	LOW	HIGH	LOW	LOW	HIGH	HIGH	LOW	LOW	HIGH

Table 3:

*Summary of included papers*

Citation	Sample	Design	Trauma exposure measure	Offending characteristics measured	Results- relationship between trauma and offending characteristics	Mediators between trauma exposure and offending or confounding variables
<b>1. Brewer-Smyth et al. (2004)</b>	<p>N=113 women in maximum and minimum security of prison in Mid-Atlantic region (USA)</p> <p>Mean Age in years (<i>SD</i>)</p> <p><i>Violent group</i> = 2.86 (11.08)</p> <p><i>Nonviolent group</i> = 33.57 (7.64)</p>	Cross-sectional between-groups	<p>Muenzenmaier's scale (1993) revised</p> <ul style="list-style-type: none"> <li>childhood sexual and physical abuse</li> <li>if any items had occurred after 18 (years since last abuse).</li> <li>abuse that resulted in hospital treatment.</li> </ul>	<p>Criminal records were evaluated for the number and types of past convictions.</p> <p>Classified as violent or nonviolent.</p> <p>Further analyses on: a) current violent conviction; b) previous violent conviction; c) had no violent conviction.</p>	<p>Significant difference between violent and nonviolent groups on child abuse total score (<math>p=.009</math>, <math>OR=1.08</math>, <math>CI=1.020-1.149</math>), number of hospital treatments required for abuse (<math>p=.039</math>, <math>OR=1.16</math>, <math>CI=1.007-1.327</math>), and years since last abuse (<math>p=.041</math>, <math>OR=0.896</math>, <math>CI=.807-.995</math>).</p> <p>Significantly higher rates of sexual abuse in violent group but not significant predictor in regression model.</p>	<p>Number of TBI with LOC significantly higher in those currently convicted of violent crime (<math>p=.024</math>, <math>OR=1.45</math>, <math>CI=1.09-1.94</math>).</p> <p>Logistic regression found that variables associated with current incarceration for violent crime were number of TBILOC (<math>p=.012</math>, <math>OR=1.5</math>, <math>CI=1.09-1.94</math>); morning cortisol levels (<math>p=.017</math>, <math>OR=.02</math>, <math>CI=.002-.53</math>); number of suicide attempts (<math>p=.026</math>, <math>OR=1.25</math>, <math>CI=1.03-1.52</math>); and years since last abuse (<math>p=.041</math>, <math>OR=.90</math>, <math>CI=.81-1</math>).</p>
<b>2. Grella et al. (2005)</b>	N=440 women eligible for a substance misuse	Retrospective cross-sectional	LSC-R (self-reports of trauma before age 16 years)	Sum of scores based on 12 criminal activities that occurred	Childhood trauma significantly associated with adolescent problem behaviours but not all trauma predicted criminal behaviour.	Link between physical abuse, witnessing family violence and criminal

Citation	Sample	Design	Trauma exposure measure	Offending characteristics measured	Results- relationship between trauma and offending characteristics	Mediators between trauma exposure and offending or confounding variables
	programme at parole from Californian department of corrections (USA)  Mean Age in years ( <i>SD</i> ) = 35.3 (6)		Measure of: Sexual abuse; physical abuse; witnessing family violence; early traumatic events (death of a close family member, victim/witness to assault by stranger, serious accident)	within two years prior to most recent incarceration.  Measured overall criminal behaviour and crime categories (drug related; property; sex work; violent)	Correlations with criminal behaviour: sexual abuse ( $r=.23^{***}$ ) physical abuse ( $r=.14^*$ ) witnessing family violence ( $r=.12^*$ ) early traumatic events ( $r=.17^{**}$ ) fostered/adopted ( $r=.09$ , ns)  Criminal behaviour predicted by adolescent conduct problems ( $\beta=.21^{**}$ ), sexual abuse ( $\beta=.20^{**}$ ) and African American ethnicity ( $\beta=.19^{***}$ ).  Violent crime was associated with early traumatic events ( $\beta=.09^*$ ).  Being fostered/ adopted predicted sex work ( $\beta=.08^*$ ).	behaviour mediated by adolescent conduct problems.
3. Driessen et al. (2006)	$N=63$ women and $N=76$ men in Bielefeld Brackwede I prison (Germany)  Mean Age in years ( <i>SD</i> ) =33.9 (9)	Cross-sectional	CTQ	Offence type; age at first offence; duration of current imprisonment; no. of previous convictions; lifetime duration of imprisonment	Offence type and length of imprisonment were not associated with childhood trauma history ( $\chi^2=44, p=.047$ ); $F_{(3)}=1.6, p=1.86$ ).  Significant negative associations between severity of trauma history and younger age at first offence ( $F_{(3)}=6.5^{***}$ )  No effect of gender on results.	N/R

Citation	Sample	Design	Trauma exposure measure	Offending characteristics measured	Results- relationship between trauma and offending characteristics	Mediators between trauma exposure and offending or confounding variables
				Measured offence leading to current incarceration. 11 offence categories, including homicide, larceny and narcotic drugs law		
<b>4. Messina et al. (2007)</b>	N= 316 women and N=425 men in Californian prison with problematic substance use history (USA)  Mean Age in years (SD) =35.8 (8.9)	Retrospective cross-sectional	LSC-R	Number of arrests; age of first arrest; age at first incarceration; number of times in prison	Women with increased trauma events had significantly lower age at first arrest <sup>***</sup> , higher number of times arrested <sup>***</sup> , younger age at first lockup <sup>***</sup> , increased number of times in prison <sup>**</sup> , and lower age at first drug* and alcohol <sup>***</sup> use.  <i>Individual correlations not reported.</i>	Women with more exposure to childhood adverse events initiate alcohol and drug use at earlier age and have increased mental health problems <sup>***</sup> .
<b>5. Byrd &amp; Davis (2009)</b>	N=151 women incarcerated in a prison in Midwest (USA)	Cross-sectional between-groups	TAA - childhood and adulthood trauma. Measures interpersonal (e.g. abuse) and non-interpersonal trauma (e.g. natural disaster)	CTS-2 Physical assault scale  Assessed frequency of violent behaviour; past convicted	No significant differences between groups when categorising by crime type so instead categorised based on CTS-2 scores for violent behaviour.  Non-interpersonal trauma only ( $t=3.21^{**}$ ) and adulthood trauma only	N/R



Citation	Sample	Design	Trauma exposure measure	Offending characteristics measured	Results- relationship between trauma and offending characteristics	Mediators between trauma exposure and offending or confounding variables
	Mean Age in years ( <i>SD</i> ) = 36.82 (11.31)		CTS-2 measures intimate partner violence	offences; current offence; sentence length; and time in prison to date.	<p>(<math>t=2.64^{**}</math>) groups reported significantly less violent behaviour.</p> <p>Violent behaviour correlated with (1) experience of physical and sexual assault (<math>r=.20^{**}</math>), (2) experience of interpersonal trauma and non-interpersonal trauma (<math>r=.27^{***}</math>), (3) frequency of physical abuse (<math>r=.43^{***}</math>).</p> <p>Regression model to predict frequency of engagement in violent behaviour. Non-interpersonal trauma and interpersonal trauma, physical and sexual assault, and frequency of physical abuse were included in regression model as predictors. Results indicated a significant regression model <math>F_{(3,147)}=13.1^{***}</math>, <math>R^2=.21</math></p> <p>Although all predictors demonstrated significant correlations with violent behaviour, only frequency of physical abuse was a significant predictor of violent behaviour in regression model, explaining 12.74% of the unique variance.</p>	

[illegible]

## Discussion

### Research Question 1: What Characteristics of Offending Are Linked to Complex Trauma?

#### **Age at first offence.**

Complex childhood trauma appears to be associated with younger age at first offence. All papers exploring this relationship found a significant association between severity of trauma exposure and younger age at first offence. Karatzias et al. (2017b) found that total CTQ scores predicted age at first offence.

Driessen et al. (2006) and Messina et al. (2007) found significant differences between groups: as trauma severity increased, age at first offence decreased.

Unfortunately these papers did not report effect sizes Or data that would allow effect sizes to be calculated, and therefore the magnitude of these relationships cannot be confirmed. There was high risk of bias in this domain due to variation in methods of reporting trauma exposure and severity and relying exclusively on self-report rather than cross-referencing with criminal and health records. The high risk of bias in this domain makes it difficult to reach firm conclusions about the predictive nature of complex trauma on earlier age at first offence however the direction of the relationship between complex trauma and earlier age at first offence is consistent across studies.

Karatzias et al. (2017b) was the only paper to assess the relationship between age at first offence and adulthood trauma, finding that adulthood trauma alone did not predict age at first offence. This result seems unsurprising given that most first offences occur early into adulthood, with an average age of 25.1 years ( $SD=11.05$ ) for this sample. This limits opportunity for exposure to significant adulthood trauma to occur. Equally, if someone is younger at first offence they

may be more likely to be in prison and therefore have less exposure to adult trauma like IPV that would be captured in the LEC scores. Further papers reporting adulthood trauma would be important to understand the role of this in offending.

### **Time in prison.**

Childhood trauma exposure appears to increase risk of recidivism. Re-victimisation as an adult may increase risk of more serious offences (as measured by longer sentence lengths). However, the high variability in measurement of offending characteristics and trauma, alongside the high risk of bias due to reliance on self-report may have influenced these results. Individuals with known cognitive deficits may struggle to remember detailed information about time in prison (Brewer-Smyth et al., 2004).

Karatzias et al. (2017b) found that childhood trauma did not predict sentence length alone, but when combined with the mediator of adulthood trauma significantly predicted sentence length in months. High selection bias due to inclusion criteria of having served a minimum six-month sentence may have influenced results. Given that many women serve short sentences for more minor crimes (Gelsthorpe & Morris, 2002) the sample may have been biased towards those who had committed more serious offences.

Driessen et al. (2006) found no significant relationship between severity of CTQ scores and lifetime months of imprisonment. However, their method of assessing time in prison does not indicate severity of crimes in the same way as Karatzias et al.'s (2017b) sentence length variable because time served to date could indicate high levels of recidivism for less severe crimes, rather than long

sentence lengths for high severity crimes (Loucks, 2004). Messina et al (2007) found that number of childhood adverse events were significantly associated with number of times in prison, with those who have experienced five or more trauma events having a mean of 15.9 ( $SD=23$ ) times in prison compared to 6.1 ( $SD=7.6$ ) times for those with no trauma experience. As previously noted, these papers did not report effect sizes for these relationships, which limits understanding of the strength of this relationship.

### **Offence type.**

Complex childhood trauma increases risk of being imprisoned for a violent crime. This may link to the interpersonal difficulties associated with complex trauma (Cloitre et al., 2012). Traumas most associated with offending were sexual and physical abuse, however this may be reflective of the lack of reporting of other traumas across papers. No papers reported the impact of adulthood complex trauma, such as IPV, on type of offending in women.

Trauma in adulthood appears to impact on offence type only if combined with pre-existing childhood trauma (Brewer-Smyth et al., 2004; Byrd & Davis, 2009). In particular, severe, prolonged or repeated childhood physical and sexual abuse is related to increased violent offending in three studies (Byrd & Davis, 2009; Brewer-Smyth et al., 2004; Grella et al., 2005). Effect sizes were reported in two papers in this domain (Brewer-Smyth et al., 2004; Grella et al., 2005) and these were small. Byrd & Davis (2009) found a medium to large effect size for severity of abuse and violent behaviour. In contrast, Driessen et al. (2006) found no significant association between trauma and offence type, however this may be because they only measured offence leading to incarceration rather than lifetime offending. It may be helpful for larger sample sizes to be recruited to

understand in more detail the strength of the relationship between complex trauma and offence type, and whether the small effect sizes are related to small sample size. The medium to large effect size from the Byrd & Davis (2009) paper increases confidence in the finding that severity of childhood abuse increases engagement in violent behaviour, but given that they recorded violent behaviour in a different way to other papers their result only relates to violent behaviour rather than offending behaviour in general.

**Research question 2: Is the timing or type of complex trauma more likely to lead to offending?**

**Types of trauma.**

Risk of bias in participant selection and methods to control confounding prevents conclusions about the predictive nature of trauma type on offending. Only two papers (Grella et al., 2005; Byrd & Davis, 2009) carried out regression analyses on particular types of trauma and offending, but their measurement of offending differed significantly. Grella et al. (2005) found that childhood sexual abuse was the only abuse that predicted criminal behaviour for WiP, with a small to medium effect size. Byrd & Davis (2009) found only frequency of physical abuse significantly predicted violent behaviour, with a medium- large effect size. Both papers, however, have high risk of bias. Grella et al.'s (2005) paper only included substance-abusing WiP and therefore may not be representative of the general WiP population. Byrd & Davis (2009) only measured violent offending and had high bias for methods to control confounding. Unlike Grella et al. (2005) they did not explore variables that might mediate the relationship between trauma and offending behaviour, such as substance use.

**Timing of trauma.**

Both papers that measured adulthood trauma exposure found that it is more likely to play a role in offending if the person has already experienced trauma as a child. Byrd & Davis (2009) identified that childhood trauma had a larger impact on offending, with those who had only experienced trauma in adulthood being significantly less likely to engage in violent behaviour. Similarly, Karatzias et al. (2017b) found that adult trauma events did not predict offending characteristics unless combined with childhood trauma scores. Although not clearly identifying if the trauma was experienced in adulthood or childhood, Brewer-Smyth et al. (2004) identified that those with violent offences had experienced trauma events significantly closer to the offence that led to incarceration (odds ratio of .896; 95% CI .807, .995]. Those who were incarcerated for violent offences had an average of 3.83 years (range: 0-13) since their last abuse compared to 9.77 years (range: 0-48) for those with nonviolent crime.

**Research Question 3: Are there any Mediators of the Link Between Complex Trauma and Offending?**

Substance use, adolescent conduct problems and adulthood trauma exposure appear to mediate offending behaviour. They were assessed by two papers as being associated with prior childhood trauma, showing low-medium effect sizes across papers and were associated with criminal behaviour in these papers, showing small effect sizes in regression equations assessing their prediction of future offending behaviour (Grella et al., 2005; Karatzias et al., 2017b). These mediators are associated with frequency and type of criminal behaviour (Grella et al., 2005), and longer sentence lengths, which could indicate higher offence severity (Karatzias et al., 2017b). Other factors investigated that do not

mediate offending are: psychological distress, such as anxiety or depression (Grella et al., 2005); emotional dysregulation; and PTSD severity (Grella et al., 2005; Karatzias et al., 2017b). The analyses methods in these papers were low risk of bias, which gives more confidence in these findings.

Number of traumatic brain injuries with loss of consciousness (TBILOC) and cortisol levels were the strongest predictors of violent behaviour in one study (Brewer-Smyth et al., 2004) however they were not included in regression analyses assessing whether they mediated the link between trauma exposure and offending. Brewer-Smyth et al. (2004) hypothesise a link between abuse and neurological sequelae leading to altered cortisol levels due to persistent stress from lifetime abuse. As well as this there is an increased vulnerability to TBILOC for individuals who experience physical abuse. The increased risk of TBILOC in physical abuse could relate to Byrd & Davis' (2009) finding that severity of physical abuse increased risk of violence because these individuals may be more disinhibited due to TBI caused by physical abuse (Brewer-Smyth et al., 2004). Further research is required to unpick the relationship between TBI, abuse and offending, particularly given that childhood TBI can have greater sequelae than adulthood TBI (Corrigan & Bogner, 2007).

### **Limitations**

A limitation of this review is the lack of second rater for the paper selection process of the review and lack of access to a translator. Two studies may have had overlapping populations due to them both recruiting from the Californian department of corrections. Equally, these studies were from a substance-abusing population of WiP and may not represent the general population of WiP. Given



the high rates of substance abuse in the prison population (Fazel, Bains, & Doll, 2006) it was felt that inclusion of these papers would not significantly bias the results.

Papers may not be representative of the worldwide population due to the majority coming from the USA and all of them coming from Western populations. Sample sizes of papers are small and cross-sectional, relying on self-report of those willing to volunteer for research, which may have biased the samples recruited.

The high risk of bias across papers reviewed impacts on the confidence with which the review questions can be answered; this is largely due to the heterogeneity in which trauma and offending characteristics were measured and the small sample sizes across papers. Effect sizes were not reported consistently across papers, which limits understanding of the magnitude of significant relationships.

### **Recommendations for future research**

Given the large heterogeneity in the methods of reporting offending characteristics it would be beneficial for a standardised method of reporting offending demographics to be developed. This would allow further comparison of the role of complex trauma in offending and development of interventions for complex trauma for those at risk of offending.

cPTSD symptoms were not measured by any of the papers but could play a mediating role in offending, particularly given findings that those with more serious offences (longer sentence lengths and violent crimes) were more likely to have higher rates of adulthood trauma (Karatzias et al., 2017b) and experienced trauma closer to incarceration (Brewer-Smyth et al. 2004). Given that cPTSD

symptoms emerge from chronic and repeated traumatisation, it is possible that the experience of childhood trauma being repeated into adulthood may increase likelihood of cPTSD and consequently impact offending severity (Karatzias et al., 2017b). Future studies should include validated measures of cPTSD to further understand the impact of complex trauma and offending, particularly to explore if cPTSD mediates the impact of complex trauma events on offending.

Adult trauma measures that are tailored to women's common trauma experiences should be utilised. Many trauma measures were originally developed for war veterans and these do not take into account the frequent 'hidden' traumas that women experience including IPV and sexual assault (Herman, 2015). Given the gender difference in trauma exposure it would be helpful for future studies to explore if gender has a role in the link between complex trauma and offending. Future studies would benefit from including increased measures of potential confounding variables, particularly TBILOC and their link between complex trauma and offending.

## Conclusions

Complex trauma exposure is associated with offending, specifically; earlier age at first offence, violent offences and more time in prison. Childhood sexual and physical abuse were most commonly reported to increase offending. Mediators of offending include adolescent substance use and conduct problems, and exposure to adulthood trauma events. More research is required to understand how complex trauma impacts on offending and future studies would benefit from describing offending behaviour in more standardised ways. Future studies should further explore the link between TBI, cPTSD, complex trauma and offending. Trauma-informed interventions for prisoners need to be developed. Prisoners would benefit from screening for complex trauma upon entry to prison in order to provide tailored trauma-informed interventions that may reduce future offending risk.

## References

- Baranyi, G., Cassidy, M., Fazel, S., Priebe, S., & Mundt, A. P. (2018). Prevalence of Posttraumatic Stress Disorder in Prisoners. *Epidemiologic Reviews*, 40(1), 134-145.
- Barnao, M., Ward, T., & Robertson, P. (2016). The good lives model: a new paradigm for forensic mental health. *Psychiatry, Psychology and Law*, 23(2), 288-301.
- Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., Sapareto, E. & Ruggiero, J. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry*, 151(8), 1132-1136.
- Bloom, B., Owen, B., & Covington, S. (2004). Women Offenders and the Gendered Effects of Public Policy. *Review of Policy Research*, 21(1), 31-48.
- Brewer-Smyth, K., Burgess, A. W., & Shults, J. (2004). Physical and sexual abuse, salivary cortisol, and neurologic correlates of violent criminal behavior in female prison inmates. *Biological Psychiatry*, 55(1), 21-31.
- Byrd, P. M., & Davis, J. L. (2009). Violent behavior in female inmates: Possible predictors. *Journal of Interpersonal Violence*, 24(2), 379-392.
- Cloitre, M., Courtois, C.A., Ford, J.D., Green, B.L., Alexander, P., Briere, J., Herman, J.L., Lanius, R., Stolbach, B.C., Spinazzola, J., Van der Kolk, B.A., Van der Hart, O. (2012). The ISTSS Expert Consensus Treatment Guidelines for Complex PTSD in Adults. Available from <http://www.istss.org/treating-trauma/istss-complex-ptsd-treatment-guidelines.aspx>

- Corrigan, J. D., & Bogner, J. (2007). Initial reliability and validity of the Ohio State University TBI Identification Method. *Journal of Head Trauma Rehabilitation, 22*(6), 318-329.
- Courtois, C. A. (2008). Complex trauma, complex reactions: Assessment and treatment. *Psychological Trauma: Theory, Research, Practice, and Policy, 5*(1), 86-100.
- Driessen, M., Schroeder, T., Widmann, B., Von Schonfeld, C. E., & Schneider, F. (2006). Childhood trauma, psychiatric disorders, and criminal behavior in prisoners in Germany: A comparative study in incarcerated women and men. *Journal of Clinical Psychiatry, 67*(10), 1486-1492.
- Egeressy, A., Butler, T., & Hunter, M. (2009). 'Traumatisers or traumatised': Trauma experiences and personality characteristics of Australian prisoners. *International Journal of Prisoner Health, 5*(4), 212-222.
- Fazel, S., Bains, P., & Doll, H. (2006). Substance abuse and dependence in prisoners: a systematic review. *Addiction, 101*(2), 181-191.
- Fazel, S., Hayes, A. J., Bartellas, K., Clerici, M., & Trestman, R. (2016). Mental health of prisoners: prevalence, adverse outcomes, and interventions. *The Lancet Psychiatry, 3*(9), 871-881.
- Gelsthorpe, L., & Morris, A. (2002). Women's imprisonment in England and Wales: A penal paradox. *Criminal Justice, 2*(3), 277-301.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41-54.
- Gray, M. J., Litz, B. T., Hsu, J. L., & Lombardo, T. W. (2004). Psychometric properties of the life events checklist. *Assessment, 11*(4), 330-341.

- Grella, C. E., Stein, J. A., & Greenwell, L. (2005). Associations Among Childhood Trauma, Adolescent Problem Behaviors, and Adverse Adult Outcomes in Substance-Abusing Women Offenders. *Psychology of Addictive Behaviors*, 19(1), 43-53.
- Herman, J. (2015). *Trauma and recovery: The aftermath of violence—from domestic abuse to political terror*. New York, NY, US: Basic Books.
- Herman, J. L. (1992). Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress*, 5(3), 377-391.
- Karatzias, T., Cloitre, M., Maercker, A., Kazlauskas, E., Shevlin, M., Hyland, P., Bisson, J., Roberts, N. & Brewin, C. R. (2017a). PTSD and Complex PTSD: ICD-11 updates on concept and measurement in the UK, USA, Germany and Lithuania. *European Journal of Psychotraumatology*, 8(sup7), 1418103.
- Karatzias, T., Power, K., Woolston, C., Apurva, P., Begley, A., Mirza, K., Conway, L., Quinn, C., Jowett, S., Purdie, A. (2017b). Multiple traumatic experiences, post-traumatic stress disorder and offending behaviour in female prisoners. *Criminal Behaviour and Mental Health*.
- Kenny, D. T., & Press, A. L. (2006). Violence classifications and their impact on observed relationships with key factors in young offenders. *Psychology, Public Policy, and Law*, 12(1), 86.
- Loucks, N. (2004). Women in prison. In J. R. Adler & J. R. Adler (Eds.), *Forensic psychology: Concepts, debates and practice*. (pp. 287-304). Devon, United Kingdom: Willan Publishing.
- Messina, N., & Grella, C. (2006). Childhood Trauma and Women's Health Outcomes in a California Prison Population. *American Journal of Public Health*, 96(10), 1842-1848.

- Messina, N., Grella, C., Burdon, W., & Prendergast, M. (2007). Childhood adverse events and current traumatic distress: A comparison of men and women drug-dependent prisoners. *Criminal Justice and Behavior*, 34(11), 1385-1401.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Annals of Internal Medicine*, 151, 264-9.
- Moloney, K. P., van den Bergh, B. J., & Moller, L. F. (2009). Women in prison: The central issues of gender characteristics and trauma history. *Public Health*, 123(6), 426-430.
- Moynan, C. R., & McMillan, T. M. (2018). Prevalence of head injury and associated disability in prison populations: a systematic review. *The Journal of Head Trauma Rehabilitation*, 33(4), 275-282.
- Perry, B. (2006). Applying principles of neurodevelopment to clinical work with maltreated and traumatized children. In N. Webb (Ed.), *Working with traumatized youth in child welfare* (pp. 27-52). New York: The Guilford Press.
- Resnick, H. S., Falsetti, S. A., Kilpatrick, D. G., & Freedy, J. R. (1996). Assessment of rape and other civilian trauma-related post-traumatic stress disorder: Emphasis on assessment of potentially traumatic events. Assessment of rape and other civilian trauma-related post-traumatic stress disorder: Emphasis on assessment of potentially traumatic events. In T. W. Miller (Ed.), *Stressful life events* (pp. 231-266). Madison, WI: International Universities Press.
- Sanderson, S., Tatt, I. D., & Higgins, J. (2007). Tools for assessing quality and susceptibility to bias in observational studies in epidemiology: a

systematic review and annotated bibliography. *International Journal of Epidemiology*, 36(3), 666-676.

Straus, M. A., Hamby, S. L., Boney-McCoy, S., & Sugarman, D. B. (1996). The revised conflict tactics scales (CTS2) development and preliminary psychometric data. *Journal of Family Issues*, 17(3), 283-316.

Stroup, D. F., Berlin, J. A., Morton, S. C., Olkin, I., Williamson, G. D., Rennie, D., Moher, D., Becker, B., Sipe, T., & Thacker, S. B. (2000). Meta-analysis of observational studies in epidemiology: a proposal for reporting. Meta-analysis Of Observational Studies in Epidemiology (MOOSE) group. *Journal of the American Medical Association*, 283(15), 2008-2012.

The Cochrane Collaboration. (2011). *Cochrane Handbook for Systematic Reviews of Interventions, Version 5.1.0, [updated March 2011]*. Retrieved from <http://handbook-5-1.cochrane.org/>

Torok, M., Darke, S., Shand, F., & Kaye, S. (2014). Violent offending severity among injecting drug users: Examining risk factors and issues around classification. *Addictive behaviors*, 39(12), 1773-1778.

Wolfe, J., Kimerling, R., Brown, P., Chrestman, K., & Levin, K. . (1997). The Life Stressor Checklist-Revised (LSC-R). [Measurement Instrument]. Available from <https://www.ptsd.va.gov/>



## **Chapter Two: Major Research Project**

### **The Epidemiology of Head Injury in Women in Scottish Prisons**

**Eleanor Seddon<sup>1</sup>**

*<sup>1</sup>Address for Correspondence*

Institute of Health and Wellbeing  
College of Veterinary, Medical and Life sciences  
University of Glasgow  
1st Floor, Administrative Building  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow  
G12 0XH

ORCID: 0000-0003-3756-4531

Chapter word count: 6965

Submitted in partial fulfilment of the requirements for the degree of Doctorate in Clinical Psychology. Prepared in accordance with the guidelines for submission to the Journal of Head Trauma Rehabilitation (See Appendix 2.1)

## **Plain English Summary**

### **Background**

Women in prison (WiP) in Scotland are six times more likely to have a head injury (HI) than the general population and have a higher risk of HI than men in prison (National Prisoner Healthcare Network, 2016). HI can impact decision making, emotion regulation and behavioural control, which could make someone more likely to offend (Durand et al., 2015). There is a lack of research on the needs of WiP with HI. WiP are more likely to have a HI from assaults than men. Their high rates of trauma, such as intimate partner violence (IPV), could cause increased HI risk (Durand et al., 2015).

### **Aims and Research questions:**

This study aims to give more information on HI in WiP and inform services of the needs of WiP with HI in order to improve wellbeing and reduce reoffending.

Research questions include:

1. What are the types, causes and severity of HI in WiP?
2. What are the other presenting problems of WiP with HI?
3. Is HI linked to offending?

## **Methods**

62 WiP over 16 years old were recruited using posters and word-of-mouth from HMP Greenock, Cornton Vale and Edinburgh. Prisoners were unable to participate if:

- they were not able to speak English
- prison staff deemed them to be a significant violence risk to researchers
- they were not able to give informed consent (such as if they had current severe mental health problems)

Participants were interviewed and completed questionnaires about HI, mental health, trauma, demographics, and offence history.

Results were described for the whole group. After this we analysed HI severity (no HI, mild, moderate-severe) and number of HIs to see if HI played a role in offending.

## **Results**

There were high rates of HI in WiP (88.7%). HIs were most likely to be mild HIs, caused by IPV, child physical abuse, and assault by a stranger. HI was associated with violent offending, number of arrests, time in prison and earlier age at first offence. 88.7% of participants were rated as “likely to have ongoing problems as a result of HI”. HI with loss of consciousness happened before reported

age of first offence in 86.5% of participants, supporting a view that it is causally linked to offending (Williams et al., 2018).

## Conclusions

There were high rates of HI in WiP. HI was associated with offending characteristics and trauma. Further research is required with bigger sample sizes to confirm the role of HI in offending. Interventions for WiP may need to be adapted for HI populations and trauma-informed.

## References

- Durand, E., Watier, L., Lecu, A., Fix, M., Weiss, J. J., Chevignard, M., & Pradat-Diehl, P. (2015). Prevalence of traumatic brain injury among female offenders in France. Results of the fleury TBI study. *Annals of Physical and Rehabilitation Medicine*, (1), e156.
- National Prisoner Healthcare Network. (2016). *Brain Injury and Offending*. Retrieved from <http://www.nphn.scot.nhs.uk/wp-content/uploads/2016/07/NPHN-Brain-Injury-and-Offending-Final-Report.pdf>.

Williams, W. H., Chitsabesan, P., Fazel, S., McMillan, T., Hughes, N.,  
Parsonage, M., & Tonks, J. (2018). Traumatic brain injury: a  
potential cause of violent crime? *Lancet Psychiatry*.

## **Abstract**

### **Introduction**

Women in prison (WiP) in Scotland are six times more likely to have a hospitalised head injury (HI) than the general population and have higher relative risk of HI than men in prison. HI is linked to increased violent offending and poorer prison rehabilitation outcomes. This study aimed to explore the epidemiology of HI in WiP and identify any unmet needs.

### **Methods**

A retrospective cross-sectional design was utilised. 62 WiP were recruited from three Scottish prisons. Self-reported cause and severity of HIs, offending characteristics and comorbidities were recorded.

### **Results**

88.7% of participants had a HI and 77.3% experienced periods of repeated blows to the head. Most likely cause of HI was assault. 68.4% of repeated HI episodes were caused by intimate partner violence (IPV). Number of HIs with LOC was significantly associated with number of arrests ( $r_s=.398$ ,  $p=.001$ ; moderate effect size, 95% CI [.17, .61] and time in prison ( $r_s=.299$ ,  $p=.027$ ; moderate effect size, 95% CI [.05, .54]). Participants with HI were significantly more likely to report violent offences than those with no HI, regardless of the HI severity ( $p=.043$ , odds ratio: 6.61, 95% CI [1.09, 40.3]). 86.5% of participants experienced HI before their first offence, indicating it may play a role in offending. Average age of first HI was 11 years, which links to poorer outcomes than adulthood HI.

### **Conclusions**

There were high rates of HI in WiP. HI was associated with offending characteristics and trauma. Further research is required with bigger sample sizes to confirm the role of HI in offending. Interventions for WiP may need to be adapted for HI populations and trauma-informed.

**Keywords:** prisoners, female, brain injuries, epidemiology

### Introduction

Preliminary analyses following a census of prisoners in Scotland indicated that prisoners are four and a half times more likely to be admitted to hospital with a head injury (HI) than the general population (National Prisoner Healthcare Network, 2016). Surprisingly, women in prison (WiP) are six times more likely to be hospitalised for HI than the general population, and have a higher relative risk of HI than men (NPHN, 2016, p.11), whereas in the general population men are twice as likely to have a HI than women (Shivaji, Lee, Dougall, McMillan, & Stark, 2014). It is unclear why there is a higher relative risk of hospitalised HI in WiP and more information about the epidemiology of HI may uncover a role in offending.

Cognitive impairments after HI including emotional dysregulation, impulsivity and problem-solving difficulties could increase offending behaviour (National Prisoner Healthcare Network, 2016; Shiroma, Ferguson, & Pickelsimer, 2010). Individuals with HI are more likely to be convicted of violent crimes (Fazel, Lichtenstein, Grann, & Långström, 2011); have more disciplinary incidents in prison (Merbitz, Jain, Good, & Jain, 1995); and have worse outcomes from prison interventions (Shiroma et al., 2010). Colantonio et al. (2014) found that 54% of WiP had a HI before their first offence, compared to 32% of men, suggesting that HI may play a larger role in women's offending (O'Sullivan, Glorney, Sterr, Oddy, & da Silva Ramos, 2015).

WiP with HI have higher trauma prevalence than WiP without HI, and men with or without HI (Colantonio et al., 2014). Women are at higher risk of HI from gender based violence (GBV), which may explain gender differences in prisoners'

HI risk (Kwako et al., 2011; Tagliaferri, Compagnone, Korsic, Servadei, & Kraus, 2006). In a study of HI in a trauma population, Doherty et al (2016) found that 27% had acquired HI through GBV. Violence was the biggest cause of HI in a study of French WiP, whereas in the general population most HIs are caused by falls and road traffic accidents (Durand et al., 2015). Women may be more likely to sustain multiple mild HIs from repeated assaults, such as from intimate partner violence (IPV), rather than a single severe trauma to the head from a fall or car accident (Kwako et al., 2011).

Self-reported HI is an important way of measuring HI prevalence in this population and previous research has noted that self-report is more likely to elicit accurate reports of HI due to the large number of HIs that go without medical attention or are undocumented (Bogner & Corrigan, 2009). Prevalence of HI measured by self-report might be higher than reflected by hospital records because women who experience IPV may not attend hospital (NHPN, 2016). Previous studies have found that women experiencing IPV rarely attend hospital, and if they do, symptoms related to cumulative effects of mild HI, such as low mood, anger and memory problems, may not be detected by healthcare professionals as being due to multiple mild HIs (Jackson, Philp, Nuttall, & Diller, 2002). Consequently, retrospective case reviews relying on healthcare professionals to identify HIs or reviewing hospital admissions is not sufficient to gain an accurate picture of HI epidemiology in this population. Examining self-reported GBV and HI may therefore shed light on an under-reported HI population.



This study investigates epidemiology of HI in WiP as part of a larger ongoing study on WiP. A second doctorate in clinical psychology trainee investigated neuropsychological impairment, disability and impact of HI on the same sample of WiP. Recognising HI in WiP helps formulate offending and addresses risk (Wortzel & Arciniegas, 2013). These studies aim to inform services of any unmet needs in this under-researched population. This would help to increase wellbeing, inform rehabilitation interventions to reduce reoffending, and support behavioural management in prison. From a public health perspective, identifying risk factors for HI in WiP could inform preventative measures.

## **Aims and Hypotheses**

### **Aims:**

To investigate epidemiology of HI in WiP in Scotland, including; cause, type, age at first HI, and severity of HI.

To investigate comorbidities of WiP with HI including trauma, substance use, physical and mental health.

To understand the role of HI in offending in WiP including; age at first offence, sentence length and offence type.

To explore reasons for high rates of HI in WiP and whether traumatic experiences, such as IPV, have causal roles in HI.

### **Hypotheses**

1. WiP are more likely to have multiple mild HIs than single moderate-severe HIs.
2. HI in WiP is more likely to precede first offence.
3. Assault is the biggest cause of HI in WiP.
4. WiP with HI are more likely to experience psychological trauma.
5. WiP who experienced IPV are more likely to have multiple mild HIs.

## **Methods**

### **Ethics**

This project was approved by NHS Research Ethics, (WOSREC 17/WS/0230) (Appendix 2.2, and Scottish Prison Service (SPS) Ethics (Appendix 2.3).

### **Design**

This was a cross-sectional quantitative design exploring epidemiological factors related to HI alongside a parallel trainee project. The same dataset was collected for both studies and then analysed separately.

### **Participants**

Sixty-two women residing in Her Majesty's Prison (HMP) Greenock, HMP Cornton Vale and HMP Edinburgh participated in the study. Five prisons in Scotland house women, however HMP Grampian and HMP Polmont were not recruited from due to time constraints. Women are allocated to prisons dependent on locality, ideally being placed close to family and previous residence. Exceptions include women first entering custody, who are all admitted via Cornton Vale for an assessment period. Women deemed to have additional support needs such as significant mental health difficulties or behavioural disturbance remain at Cornton Vale. Interviews were in meeting rooms in the halls, or the Link Centres (typically used for outside agency interviews).

### **Eligibility Criteria**

Participants were eligible to participate if they: i) were a woman residing in a Scottish prison aged 16 years or over; ii) had sufficient understanding of English

to participate; iii) could give informed consent; and iv) were not deemed by prison staff to pose significant violence risk to researchers. Four transgender participants took part in the study. Their data are not analysed separately given the small numbers.

### **Recruitment**

Prison staff were approached to discuss the study rationale and supported recruitment. Posters and information sheets were distributed and displayed in prominent areas. Information sheets were also discussed verbally before obtaining informed consent to combat literacy issues (See Appendix 2.6, 2.7). A related study on men in prison found similar recruitment procedures effective (McGinley, 2017). To reduce biased sampling, recruitment emphasised that having a HI was not a participation requirement. Researchers completed SPS mandatory safety induction before recruitment. Recruitment and data collection ran from January to May 2018. Interviews were carried out by the two doctorate in clinical psychology trainees and the research worker from the ongoing larger study. A pilot upon study commencement established administration consistency. Researchers observed each other administer the interview battery to three participants and double-marked measures (n=18) for interrater reliability. Inconsistencies were resolved by discussion.

### **Research Procedures**

Participants completed a semi-structured interview lasting 60-90 minutes involving questionnaires and cognitive assessment. Informed consent was obtained before interview and confidentiality and its limits were explained. Breaks were offered during the interview. Concerns raised during participation,

such as suicidality or significant cognitive impairment, were shared with SPS and healthcare staff (See Appendix 2.8). Two participants discontinued prior to completion of the study but consented to their data to be retained in the study.

### **Measures**

Measures are summarised below. Questionnaires were presented in writing and orally to account for cognitive difficulties. Appendix 2.4 summarises measures completed for the parallel trainee project.

#### **The Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID, Corrigan & Bogner, 2007).**

A gold-standard semi-structured interview identifying self-reported lifetime exposure to HI including; cause, severity (length of loss of consciousness, LOC), age of HI, single HIs, and periods of multiple HIs. Interviewees are not asked to give precise number of HIs experienced during repeated HI episodes due to lack of reliability in providing precise estimates of HIs experienced. Individuals who have experienced periods of multiple HIs may experience memory problems that impact on their ability to provide an accurate report of the number of HIs experienced. Consequently, measuring periods of repeated HI using the OSU TBI-ID allow us to identify the cause of the repeated HI, how many years it occurred for and the typical and worst severity of HI (measured by longest LOC). Results of the OSU TBI-ID indicate whether the person is likely to have consequences from HI. It has good inter-rater reliability and is validated for use in USA prisons (Corrigan & Bogner, 2007) (Appendix 2.9).

**Traumatic Life Events.**

An adapted 21-item Traumatic Life Events Questionnaire (TLEQ) (Kubany et al., 2000) assessed lifetime traumatic events exposure; age and frequency of exposure; and whether it caused HI (See Appendix 2.10). The TLEQ was adapted to reduce risk of flashbacks from repetitive questioning on sexual abuse. Questions on the age of perpetrator and timing of abuse were simplified to sexual abuse 'below' and 'above' 16 years.

**Post-Traumatic Stress Disorder (PTSD) Symptomatology.**

The PTSD Checklist of DSM-V (PCL-5) is a validated self-report of 20 PTSD symptoms experienced over the last month. Ratings on a five point Likert scale range from 0 (not at all) to 4 (extremely). Scores above 33 suggest that symptoms meet DSM-V PTSD criteria (Weathers, 2013). It was used successfully in a recent study of WiP and has strong internal consistency and test-retest reliability (Howard, Karatzias, Power, & Mahoney, 2017).

**Anxiety and Depression.**

Symptoms of anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS), a 14-item self-report questionnaire. Scores of 11 or above suggest caseness and it is validated for HI populations (Whelan-Goodinson, Ponsford, & Schönberger, 2009; Zigmond & Snaith, 1983).

**Demographics.**

Information collected included; age, ethnicity, education, employment, chronic physical and mental health conditions as categorised by ICD-10 (World Health Organisation, 1992), and problematic substance use. Socioeconomic status was

calculated using Scottish Index of Multiple Deprivation (SIMD) scores (Scottish Government, 2012). Self-reported offending characteristics recorded were: age of first offence that brought them into contact with the legal system, number of arrests, charges and convictions; type of offence (violent or nonviolent); and estimated total time in prison (See Appendix 2.11 for data capture form).

### **Representativeness of sample**

Given the paucity of literature in this area, this study is beneficial because it provides further normative data for WiP with HI for measures described above to calculate sample size and power for future studies. A recent meta-analysis estimated prevalence of HI with LOC in WiP is 55.28% (CI 41.26-69.29) (Shiroma et al., 2010), suggesting that 203 (151-254) WiP in Scotland have HI with LOC. Consequently, we expected 34 (26-43) of our sample to have HI with LOC. We assessed the sample's representativeness by comparing it to epidemiological data from the NPHN (2016) census of Scottish prisoners.

### **Data Analysis**

Descriptive and inferential statistics were undertaken using IBM SPSS version 21. Linear regression was planned to assess whether offending severity (measured by longest sentence length) was predicted by HI or epidemiological characteristics, such as trauma exposure or substance use. Between groups comparisons explored epidemiological differences between HI severity groups.

## Results

### Demographics

62 WiP participated in the study, representing approximately 16.8% (16.3%-17%) of WiP in Scotland (Scottish Prison Service, 2018). Participants were from HMP Greenock ( $n=17$ , 27.4%); Cornton Vale ( $n=25$ , 40.3%) and Edinburgh ( $n=20$ , 32.3%). Participants ranged from 20-73 years old ( $mean=36.9$ ;  $SD=10.3$ ). Chi-square goodness of fit testing found no significant age differences between the sample and NPHN (2016) census ( $X^2=2.24$ ,  $p=0.33$ ). Distribution of SIMD quintiles in Table 1, represent national social deprivation levels from 1 (most deprived) to 5 (least deprived) (Scottish Government, 2012). Most of the sample (90.4%) were from highest deprivation quintiles 1 and 2.

**Table 1 :**

*Age and socioeconomic status of participants and the national population of WiP in Scotland*

		Sample <i>n</i> (%)	Prison census <i>n</i> (%)
<b>Age Range</b>  <b><i>N=62</i></b>	16-29	15 (24.2)	123 (28.8)
	30-39	30 (48.4)	178 (41.7)
	40-49	9 (14.5)	82 (19.2)
	50-79	8 (12.9)	44 (10.3)
<b>SIMD</b>  <b>Quintile<sup>1</sup></b>  <b><i>n=42</i></b>	1 (0-1395)	29 (69)	234 (55.1)
	2 (1396-2790)	9 (21.4)	111 (26.1)
	3 (2791-4185)	2 (4.8)	42 (9.9)
	4 (4186-5580)	0	23 (5.4)
	5 (5581-6976)	2 (4.8)	15 (3.5)

SIMD- Scottish Index of Multiple Deprivation

<sup>1</sup> 32.3% ( $n=20$ ) of participants could not remember their postcode



Distribution of ethnicity fits with demographics from a Scottish prison census where 96% of prisoners were white (House of Commons, 2017). Average years of education were 11.2 years and participants frequently reported missing school due to illness (33.3%), truancy (76.7%) and suspension (50.8%). 53.2% attended mainstream school, 11.3% reported 1:1 school support and 33.9% attended specialist schools. One participant had no schooling because her country of origin prohibited women's education. The majority were unemployed (30.6%) or in lower skilled/lower paid employment (33.9%). 79% ( $n=49$ ) of participants reported histories of problematic substance use.

**Table 2:**  
***Demographics***

<b>Gender (N, %)</b>	
Cisgender women	58 (93.5%)
Transgender women	3 (4.8%)
Transgender men	1 (1.6%)
<b>Ethnicity (N,%)</b>	
White	60 (96.8 %)
Asian	1 (1.6%)
Mixed Race	1 (1.6%)
<b>Years of education (Mean, SD)</b>	11.23 (1.74)
<b>Schooling (N, %)</b>	
Mainstream	33 (53.2%)
Mainstream with 1:1 support	7 (11.3%)
Specialist	21 (33.9%)
<b>Absence from school (N,%)</b>	
Due to illness	20 (33.3%)
Due to truancy	46 (76.7%)
Due to suspension/ exclusion	31 (50.8%)
<b>Occupation (N, %)</b>	
Unemployed	19 (30.6%)
Elementary	21 (33.9%)
Sales/ Customer Service	11 (17.7%)
Skilled Trades/ Caring/Leisure/ Service	10 (16.1%)
Manager/ Director/ Senior	1 (1.6%)
<b>Previous Problematic drug or alcohol use (N, %)</b>	49 (79%)
<b>Previous problematic alcohol use (N, %)</b>	31 (51.6%)
<b>Previous problematic drug use (N, %)</b>	44 (71%)

### Physical and mental health comorbidities

66.1% ( $n=39$ ) reported physical health problems and 90.2% ( $n=55$ ) reported mental health problems. Self-reported physical and mental health was classified according to ICD-10 (World Health Organization., 1992). Prevalent physical health problems were musculoskeletal, such as arthritis (32.3%,  $n=20$ ); nervous (24.2%,  $n=15$ ), such as migraines/chronic pain; and circulatory (19.4%,  $n=12$ ), such as heart attack. HI and substance dependence were not included in ICD categorisation due to assessment elsewhere.

80.7% ( $n=50$ ) reported mood disorder and 69.4% ( $n=43$ ) reported anxiety disorders. HADS scores found 77% ( $n=42$ ) of participants were above cut-off for anxiety and 36.7% ( $n=22$ ) for depression. PCL-5 scores identified 75% of participants ( $n=45$ ) above cut-off for provisional diagnosis of PTSD (See Table 3). Traumatic life events are discussed separately. Appendix 2.12 has further details of health conditions.

**Table 3:**

#### *HADS and PCL-5 Scores*

Measure	Mean (SD), Median
PCL-5	45.4 (19.2), 45
HADS Anxiety	12.57 (4.69), 13
HADS Depression	9.28 (4.83), 9

PCL-5 - Post traumatic Stress Disorder Checklist for DSM-V  
HADS- Hospital Anxiety and Depression Scale

Table 4:

*Self-reported offending characteristics*

	Mean (SD); Median, IQR
Age at first Offence	22.76 (13.17); 17 (15-27)
Number of arrests	22.02 (32.32); 10 (2.75-30)
Number of convictions	10.97 (38.54) 3 (1-10)
Longest Prison Sentence in years	6.32 (7.4); 3 (1-11.88)
Offending types (N, %)	
Violent	45 (86.5%)
Property	26 (60.5%)
Sexual	3 (10.3%)
Other	43 (86%)

Table 4 summarises offending characteristics for the group.

## Head Injury Epidemiology

88.7% ( $n=55$ ) of participants reported a HI and 77.4% ( $n=48$ ) reported a period of time where they received repeated blows to the head. Around half of those with HI said they did not go to hospital ( $n=29$ , 52.7%). As hypothesised, the most prevalent HI severity reported was mild with LOC <30 minutes ( $n=27$ , 45.2%) and WiP were more likely to have repeated mild Hi ( $n=34$ ) than single incident moderate-severe HIs ( $n=3$ ).

**Table 5:**

***Head injury history (Mean, SD, Median, IQR)***

N= 55

Age at first HI (years)	11.25 (8.42) 9 (5-16)
Age first HI with LOC (years)	16.44 (8.98) 16 (10.5-18)
Number of HIs (Single incident and repeated)	2.98 (2.28) 2 (1-5)
Number of HI with LOC <30 minutes	1.53 (1.67) 1 (0-2.25)
Number of HI with LOC >30 minutes	0.44 (0.85) 0 (0-1)
Number of time periods with repeated blows to the head ( $n=48$ )	1.24 (0.92) 1 (1-2)
Duration of repeated blows to the head (years)	11.84 (13.35) 8 (1-19.5)
Maximum days in hospital for HI	7.96 (48.7) 0 (0-1)
OSU-TBI ratings of “likely” ongoing problems from HIs, $n$ (%)	55 (88.7%)
Worst Head Injury Severity, $n$ (%),	
No HI	7 (11.3%)
Mild (no LOC)	12 (19.4%)
Mild (LOC < 30 minutes)	27 (45.2%)
Moderate (LOC 30 minutes -24 hours)	15 (22.6%)
Severe LOC (>24 hours)	1 (1.6%)

HI - Head Injury

LOC- Loss of Consciousness

OSU-TBI - Ohio State University Traumatic Brain Injury Identification Method

### Cause of Head Injury

Cause of HI is summarised for single and repeated HI episodes in Table 6. The most common causes of HI were domestic assault ( $n=74$ , 40%); ‘assault-other’ ( $n=45$ , 24.32%); and falls ( $n=28$ , 15.12%). This is in line with the hypothesis that assault (domestic or other) would be the most common cause of HI in WiP. Of the 48 participants with repeated HI, 34 (70.8%) stated that their worst HI was mild (dazed or LOC <30 minutes), representing 85% of the total mild HIs recorded.

**Table 6:**

*Cause of head injury in participants*

	Single Episodes (Total $N=106$ )	Repeated Episodes (Total $N=79$ )	Total (Total $N=185$ )
	$n$ (%)	$n$ (%)	$n$ (%)
Fall	19 (17.9%)	9 (11.4%)	28 (15.1%)
Assault -domestic	20 (18.9%)	54 (68.4%)	74 (40%)
Assault -other	36 (34%)	9 (11.4%)	45 (24.3%)
Road Traffic Accident (RTA)	13 (12.3%)	0	13 (7%)
Sport	12 (11.3%)	4 (5.1%)	16 (8.7%)
Other	6 (5.7%)	3 (3.8%)	9 (4.9%)

### Head Injury versus Offending

As hypothesised, HI with LOC occurred before first offence for 86.5% of participants. Number of HIs with LOC (single and repeated HI) correlated significantly with number of arrests, ( $r_s=.398$ ,  $p=.001$ ; weak-moderate effect size, 95% CI [.17, .61] ). Table 7 summarises HI and offending correlations.

**Table 7:**

*Spearman correlations for offence characteristics and HI*

	Total HIs with any LOC (single and repeated)	Total HIs with LOC >30 minutes (single and repeated)	Worst HI (Longest LOC)
Number of Arrests	.398 $p=.001$ 95% CI [.17, .61]	.289 $p=.033$ 95% CI [.012, .54]	.265 $p=.037$ 95% CI [.03, .48]
Total time in prison to date	.069 $p=.624$ 95% CI [-.23, .35]	.299 $p=.027$ 95% CI [.05, .54]	.249 $p=.064$ 95% CI [-.01, .49]
Longest Sentence length	-.012 $p=.934$ 95% CI [-.30, .30]	.106 $p=.458$ 95% CI [-.171, .36]	.136 $p=.337$ 95% CI [-.11, .38]
Age first offence	-.298 $p=.027$ 95% CI [-.52, -.02]	-.228 $p=.097$ 95% CI [-.45, .02]	-.236 $p=.083$ 95% CI [-.49, .03]

HI- Head injury

LOC- Loss of consciousness

HI severity was grouped into 'no HI', 'mild HI' (dazed or LOC less than 30 minutes), and 'moderate-severe HI' due to small severe HI group. Fisher's Exact Test found that HI severity was associated with violent offending, ( $F(2)=6.63$   $p=.029$ , Cramer's  $V=.353$ , 95% CI [.11, .61], large effect size). Post-hoc comparisons using Fisher's exact tests identified that there was no significant difference in violent offending between those with mild HI (Dazed or LOC <30 minutes) and moderate-severe HI ( $p=.97$ ) but those with HI were significantly more likely to report violent offences than those with no HI, regardless of the HI severity ( $p=.043$ , odds ratio: 6.61, 95% CI [1.09, 40.3]).

In order to explore the impact of repeated HI on offending individuals were divided into those with three or less episodes mild HI with LOC less than 30 minutes versus those with more than three episodes of mild HI with LOC less than 30 minutes. This is based on previous research by Guskiewicz et al (2003), which found that individuals with less than three episodes of mild HI with LOC less than 30 minutes had significantly fewer cumulative HI symptoms. Fishers Exact Test found that individuals with repeated mild HI were significantly more likely to report violent offences than individuals with mild HI with less than three episodes of LOC ( $p=.04$ , odds ratio=4.33, 95% CI [1.1, 17.11]). Table 8 summarises HI and offending characteristics.

**Table 8:**  
***Summary of Head Injury and Offending***

		Number of arrests <i>Median</i>	Number of convictions <i>Median</i>	Longest prison sentence (years) <i>Median</i>	Violent offence <i>n (%)</i>	Non-violent offence (property or other) <i>n (%)</i>	Age first offence (years) <i>Median</i>
Worst HI	No HI <i>n=7</i>	2	2	1.8	3 (42.9%)	5 (71.4%)	25
	Mild (no LOC) <i>n=12</i>	5	2	5.3	10 (83.3%)	10 (83.3%)	21
	Mild (LOC< 30 minutes) <i>n=27</i>	12	3	2.2	19 (67.9%)	23 (82.1%)	17
	Moderate - Severe (LOC >30 min) <i>n=16</i>	20	7	4	13 (86.7%)	15 (100%)	17
Number HIs with LOC <sup>2</sup>	0 ( <i>n=7</i> )	2	2	1.8	3 ( 42.9%)	5 (71.4%)	25
	1 - 2 ( <i>n=26</i> )	9	2	4	20 (76.9%)	21 (80.8%)	20
	3+ ( <i>n=29</i> )	12	6	2.2	22 (75.9%)	27 (93.1%)	15
First HI LOC	Before 15 years ( <i>n=22</i> )	33	20	4.9	16 (72.7%)	7 (31.8%)	15
	After 15 years ( <i>n=38</i> )	17	6	7.5	28 (73.7%)	18 (47.4%)	18

HI- Head Injury

LOC- Loss of Consciousness

<sup>2</sup> Includes number of single and repeated HIs (step two and three of OSU-TBI-ID)



### Comorbidities of HI

HI severity was significantly associated with higher PCL-5 scores, traumatic life experiences, problematic substance use, witnessing violence at home and experience of IPV (See Table 9).

**Table 9:**

*Between groups comparisons of comorbidities and offending*

*(Mean (SD) Median)*

	No HI <i>n</i> =7	Mild HI (dazed or LOC<30 minutes) <i>n</i> =39	Moderate- Severe HI (LOC>30 minutes) <i>n</i> =16	Kruskal Wallis ( <i>H</i> ) Pairwise comparisons with Bonferroni correction for multiple comparisons
PCL-5 score	24 (15) 25	47 (19) 47	53 (15) 57	$H_{(2)} = 9.646, p=.008$  No HI - Mild HI $p=.019, r=.35, SE= .14$ Medium effect size  No HI- Mod/Sev HI $p=.007, r=.39, SE=.20$ Medium effect size  Mild HI- Mod/Sev HI $p=.368, r=.12, SE=.13$ Small effect size
TLEQ total trauma events	5.86 (1.8) 5	9.13 (4.1) 8.5	10.27 (3.9) 11	$H_{(2)} = 8.702, p=.004$  No HI -Mild HI $p=.052, r=.31, SE= .14$ Medium effect size

**No HI - Mod/Sev HI** **$p=.01, r=.37, SE=.20$** 

Medium effect size

**Mild HI - Mod/Sev HI** **$p=.659, r=.16, SE=.14$** 

Small effect size

				<b><i>Fishers Exact Test (FI)</i></b>
<b>History of substance use problems</b>	<b><math>n=3</math></b>	<b><math>n=32</math></b>	<b><math>n=14</math></b>	<b><math>FI_{(2)}=6.357, p=.036</math></b>
	<b>42.9%</b>	<b>80%</b>	<b>93.3%</b>	<b>Cramer's <math>V = .346</math></b>
				<b>95% CI [.118, .641]</b>
				<b>medium-large effect size</b>
<b>Witnessed violence in childhood home</b>	<b><math>n=3</math></b>	<b><math>n=26</math></b>	<b><math>n=13</math></b>	<b><math>FI_{(2)}=6.188, p=.04</math></b>
	<b>42.9%</b>	<b>66.7%</b>	<b>92.9%</b>	<b>Cramer's <math>V = .320</math>,</b>
				<b>95% CI [.142, .535]</b>
				<b>medium effect size</b>
<b>IPV</b>	<b><math>n=2</math></b>	<b><math>n=30</math></b>	<b><math>n=13</math></b>	<b><math>FI_{(2)}=9.017, p=.008</math></b>
	<b>28.6%</b>	<b>76.9%</b>	<b>92.9%</b>	<b>Cramer's <math>V = .418</math></b>
				<b>95% CI [.185, .656]</b>
				<b>large effect size</b>

HI - Head Injury

LOC- Loss of consciousness

PCL-5 - Post traumatic Stress Disorder Checklist for DSM-V

TLEQ- Traumatic Life Events Questionnaire

IPV- Intimate Partner Violence

## Trauma

As discussed, two participants discontinued the study prior to completing the trauma measures. Consequently sample size for this section is 60. The average number of traumatic events experienced were 9 ( $SD=3.97$ ). Most prevalent traumas were; sudden death of a loved one ( $n=49$ , 81.7%), IPV ( $n=45$ , 75%) and threats of serious physical harm ( $n=44$ , 73.3%). 85.5% ( $n=53$ ) reported repeated interpersonal trauma (trauma repeated three or more times) (see Table 10).

**Table 10:**

### *Traumatic life events and corresponding HIs*

Traumatic Experience ( $N=60$ ) (see TLEQ in Appendix 2.10 for full questions)	Experienced $n$ (%)	Caused a head injury $n$ (%)
Natural disaster	3 (4.8%)	0
Motor vehicle accident	14 (23.3%)	9 (14.3%)
Other accident	13 (21.7%)	3 (4.8%)
Exposure to war	0	0
Death of friend/loved one	49 (81.7%)	2 (3.2%)
Loved one accident/assault/illness	30 (50%)	2 (3.2%)
Life threatening illness	16 (26.7%)	3 (4.8%)
Robbery with a weapon	28 (46.7%)	4 (6.3%)
Assault by a stranger	27 (45%)	18 (28.6%)
Witnessed assault	30 (50.8%)	3 (4.8%)
Threats of serious harm	44 (73.3%)	14 (22.2%)
Child Physical Abuse	21 (35%)	15 (23.8%)
Witnessed family violence	42 (70%)	3 (7.1%)
IPV	45 (75%)	39 (61.9%)
Child Sexual Abuse	37 (61.67%)	2 (3.2%)
Adult Sexual Abuse	30 (50%)	6 (9.5%)
Unwanted sexual attention	30 (50%)	1 (1.6%)
Stalking	28 (45.2%)	1 (1.6%)
Miscarriage	29 (46.8%)	0
Abortion	17 (27.4%)	0
Other	27 (43.5%)	3 (4.8%)

TLEQ- Traumatic Life Events Questionnaire  
IPV- Intimate Partner Violence

Prevalent traumatic events that caused HI were IPV (65%,  $n=39$ ), assault by a stranger (28.6%,  $n=18$ ) and child physical abuse (23.8%,  $n=15$ ). As hypothesised, WiP with HI were more likely to experience psychological trauma, with number of traumatic life events correlating significantly with number of HI, ( $r_s=.68$ ,  $p=.001$ , 95% CI [.492, .811], large effect size).

Fisher's exact test found that individuals who experienced IPV were significantly more likely to have three or more HIs ( $p=.006$ ), with an odds ratio of 7 (95% CI [1.77, 27.8] (See Figure 1). As hypothesised, Fisher's exact tests found that WiP who experienced IPV were significantly more likely to have multiple mild HIs than those with no reported IPV ( $p=.012$ , odds ratio: 5.69, 95% CI [1.51, 21.5]).

Individuals with violent offences reported significantly more trauma events (*Median*=10) than those with nonviolent offences (*Median*=7), ( $U=203.5$ ,  $z=-2.84$ ,  $p=.005$ ,  $r=-.36$ , 95% CI [-.53, -.14 ], medium effect size). Fisher's exact test found IPV was significantly associated with violent offending, ( $p=.02$ ), with an odds ratio of 5.29 (95% CI [1.49, 18.82]). Those who experienced sexual assault as an adult were significantly more likely to have a violent offence ( $p=.039$ ), with an odds ratio of 4.33 (95% CI 1.2, 15.6]). There was no significant association between reported child sexual abuse ( $p=.77$ ) or physical abuse ( $p=.38$ ) and violent offending.

Due to heterogeneity of variance and data not being normally distributed, multiple linear regression analyses were not appropriate for predicting offending because data violated test assumptions. Predictor variables planned to be entered into the linear regression model were: total number of head injuries;

total trauma events; total PCL-5 score; and history of substance use. Sentence length was planned to be used as an outcome variable.

Residuals for these variables, as measured by histograms and P-P plots were not normally distributed and therefore violated test assumptions for linear regression. Methods attempted to support this regression analysis included bootstrapping, transformation (log, square root, LN-1), and removal of outliers. However, data continued to violate test assumptions and therefore linear regression was not possible.

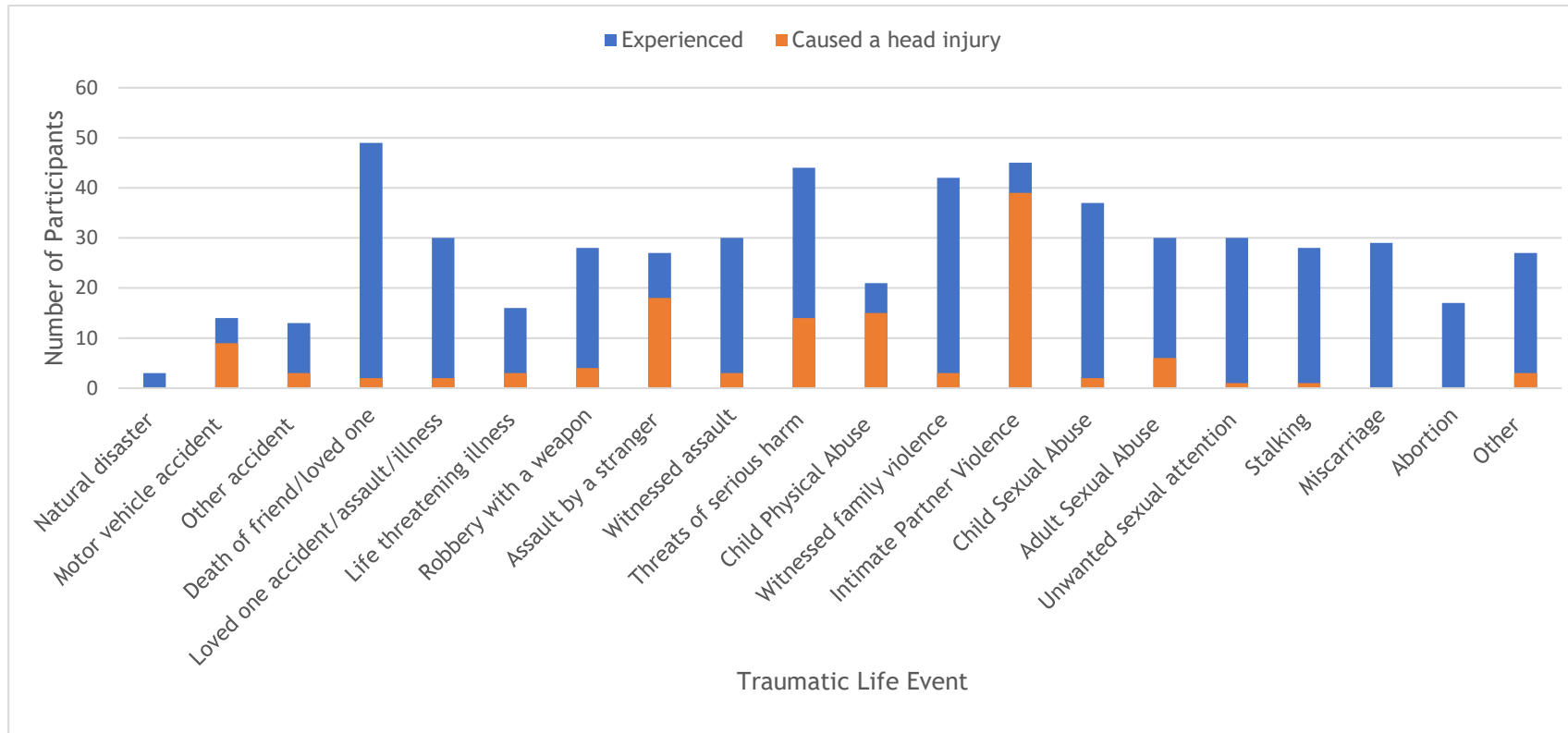


Figure 1: Traumatic events and their link to HI

### Discussion

Overall there was high prevalence of HI (88.7%) and repeated HI (77.3%) in this sample of WiP. Number of HIs with LOC ( $n=43$ ) corresponded with estimates from the Shiroma et al. (2010) meta-analysis. In line with previous studies of WiP, HIs were most likely to be mild and caused by assaults (Colantonio et al., 2014). The average age of first HI was 11 years, which may cause poorer outcomes than HI obtained in adulthood (Corrigan & Bogner, 2007). All participants who had a HI were rated as “likely to have ongoing problems as a result of HI” on the OSU-TBI-ID, suggesting a need for HI-informed interventions and services.

HI was associated with increased violent offending, number of arrests, time in prison and earlier age at first offence. HI with LOC occurred prior to reported age of first offence in 86.5% of the sample, supporting a view that it is causally linked to offending (Williams et al., 2018). It is possible that the association between HI and younger age at first offence may be driven by people with HI being more vulnerable to being caught by the police. HI therefore may not cause the offending behaviour directly, but may link to individuals being less adept in their offending and therefore having contact with the legal system earlier than those without HI (O’Sullivan et al., 2015).

The prevalence of HI caused by IPV might explain why only about half of participants attended hospital for HI. People experiencing IPV rarely attend hospital for HI despite the high HI risk (Jackson, Philp, Nuttall, & Diller, 2002). Equally, if an individual experiences a mild HI they may not think it warrants hospital attendance. Symptoms related to the cumulative effects of multiple mild HI are often non-specific, such as headaches and fatigue, and if individuals

seek help, healthcare professionals may not identify HI as the cause of difficulties or ask about IPV (Jackson et al., 2002).

Our findings suggested that the presence of HI is linked to violent offending. There were no significant differences between moderate-severe and mild HI for violent offending however it is arguable that this may be because of the cumulative effects of multiple mild HI causing impairment similar to that of moderate-severe HIs (Corrigan & Bogner, 2007). Larger samples sizes that allow comparison of single incident mild HI compared to multiple mild HI may help support this argument. Given that people with multiple mild HI were significantly more likely to have violent offences than those with no HI, identification of individuals with multiple mild HI is important to reduce offending risk. Repeated mild HIs represent a crucial area that requires further support in identification and prevention, particularly given the long average duration of repeated HI of 11 years. It is important to note the possibility of reverse causality in the relationship between multiple HI and violent offending. Previous research has noted that violent offending, and consequent imprisonment can result in higher vulnerability of acquiring a HI (Schofield et al., 2015). However, given our finding that HI occurred prior to reported age at first offence, and that the cause of multiple HI was often intimate partner violence, it appears that it may be more likely that the HI preceded first offence. Further research incorporating more detailed measures of offending characteristics may allow further exploration of this relationship.

Sequelae of repeated mild HI, such as emotional dysregulation, impulsivity and memory problems may increase offending and recidivism (Williams et al., 2018).



Equally these symptoms could be due to the prolonged traumatisation associated with repeated HIs. Complex PTSD (cPTSD) encompasses symptoms of emotional dysregulation and relationship problems resulting from interpersonal traumatic experiences occurring repeatedly or for prolonged periods, such as child abuse and IPV (Herman, 1992). These may mirror symptoms of HI so further research distinguishing the sequelae of repeated mild HI and that of cPTSD would be helpful.

The significant relationship between IPV and HI suggests that services may need to provide trauma-informed interventions adapted for cognitive deficits associated with HI. The high rates of IPV in WiP indicate a need for interventions targeting victims and offenders of IPV. Early interventions for children and young people who have witnessed IPV or experienced abuse could provide opportunities for challenging cognitive distortions about gender roles and relationship conflict management. This could prevent them entering IPV relationships as adults (Holt, Buckley, & Whelan, 2008).

Given the high prevalence of HIs and trauma in WiP, intervening solely in prison may not be not sufficient. Instead, women 'at risk of offending' or recently released from prison would benefit from community-based resources. Cognitive deficits associated with HI mean that individuals will likely require repetition and ongoing support to maintain benefits from prison-based interventions, which community-based supports could provide (Williams et al., 2010). Recognising HI in WiP using screening tools such as the OSU-TBI-ID could identify those in need and help tailor prison and community rehabilitation. Additionally, training of

prison and parole staff in HI and complex trauma would support individuals with HI and help staff formulate risk behaviour (Colantonio et al., 2014).

The high prevalence of HI and trauma in the sample indicates that WiP may have unmet needs in relation to interventions for reducing offending that are both trauma and HI informed. Given that all WiP who experienced a HI were rated by the OSU-TBI-ID as being likely to have ongoing problems as a result of their HI, there appears to be an unmet need in terms of both staff awareness of HI prevalence and sequelae, and interventions for WiP that are HI informed.

Previous research has identified that staff may not be aware of the sequelae of HI and may attribute difficulties to individuals deliberately acting in a challenging manner (Allely, 2016). Staff training in identification of HI and management of individuals with HI may support understanding of the consequences of HI. Other unmet needs identified by this study include high levels of PTSD symptoms, anxiety, depression and physical health comorbidities, which may reflect a need for further prison-based interventions to improve wellbeing.

### **Limitations**

A limitation of this study is the modest sample size which has prevented regression analyses. Correlations indicate significant relationships between HI and offending however it was not possible to explore predictive relationships. It is predicted that as sample size increases, data will become more normally distributed. Further recruitment and analyses would allow understanding of whether HI is predictive of offending characteristics. This would also allow

exploration of other variables that might influence offending, such as trauma experiences and substance use.

The study is based on self-report, which may be unreliable in a population with cognitive deficits and memory problems (Brewer-Smyth, Wolbert Burgess, & Shults, 2004). Positively, we supported individuals with reading difficulties by making participant information sheets easy read, developing visual scales for questionnaires and reading questionnaires aloud for participants.

It would be helpful for future studies to access criminal and hospital records to cross-reference offending behaviour and hospitalised HI. Nevertheless, self-report provides a way of recording HIs and trauma that may not have been previously disclosed. Another benefit is that it allows recording of multiple mild HIs that would not have required hospitalisation individually but potentially have a cumulative effect.

### **Implications for future research**

Future research on HI prevalence in WiP would benefit from cross-referencing self-reported HI and offending behaviour with hospital and criminal records. Future studies on the role of HI and trauma in offending in WiP would benefit from using a cPTSD measure to distinguish further the role of HI and trauma. Comparison studies of a cPTSD community and cPTSD prison population may increase understanding of mechanisms between complex trauma and offending, and HIs role in this. Development of HI-informed trauma interventions is important in order address needs of WiP. Qualitative study of prison staff's

understanding of HI, complex trauma and their impact on offending may help identify areas of staff training.

### **Conclusions**

Overall this study found high rates of HI in WiP, particularly repeated mild HI linked to IPV. HI was significantly associated with number of arrests and time in prison, and most participants experienced HI before first offence. Research with larger samples should be undertaken before firm conclusions can be drawn regarding HI's role in offending. Our findings suggest that services for WiP need to be trauma and HI-informed. It is recommended that community-based resources are developed to support this population following release to reduce risk of reoffending.

## References

- Allely, C. S. (2016). Prevalence and assessment of traumatic brain injury in prison inmates: a systematic PRISMA review. *Brain injury*, 30(10), 1161-1180.
- Bogner, J., & Corrigan, J. D. (2009). Reliability and predictive validity of the Ohio State University TBI identification method with prisoners. *The Journal of head trauma rehabilitation*, 24(4), 279-291.
- Brewer-Smyth, K., Wolbert Burgess, A., & Shults, J. (2004). Physical and sexual abuse, salivary cortisol, and neurologic correlates of violent criminal behavior in female prison inmates. *Biological Psychiatry*, 55(1), 21-31. doi:10.1016/S0006-3223(03)00705-4
- Colantonio, A., Kim, H., Allen, S., Asbridge, M., Petgrave, J., & Brochu, S. (2014). Traumatic brain injury and early life experiences among men and women in a prison population. *Journal of Correctional Health Care*, 20(4), 271-279. doi:10.1177/1078345814541529
- Corrigan, J. D., & Bogner, J. (2007). Initial reliability and validity of the Ohio State University TBI identification method. *The Journal of Head Trauma Rehabilitation*, 22(6), 318-329.
- Doherty, S. M., Craig, R., Gardani, M., & McMillan, T. M. (2016). Head injury in asylum seekers and refugees referred with psychological trauma. *Global Mental Health*, 3, e28. doi:10.1017/gmh.2016.23
- Durand, E., Watier, L., Lecu, A., Fix, M., Weiss, J. J., Chevignard, M., & Pradat-Diehl, P. (2015). Prevalence of traumatic brain injury among female offenders in France. Results of the fleury TBI study. *Annals of Physical and Rehabilitation Medicine*, 1, e156.

- Fazel, S., Lichtenstein, P., Grann, M., & Långström, N. (2011). Risk of Violent Crime in Individuals with Epilepsy and Traumatic Brain Injury: A 35-Year Swedish Population Study. *PLoS Medicine*, 8(12), e1001150. doi:10.1371/journal.pmed.1001150
- Guskiewicz, K. M., McCrea, M., Marshall, S. W., Cantu, R. C., Randolph, C., Barr, W., Onate, J. & Kelly, J. P. (2003). Cumulative effects associated with recurrent concussion in collegiate football players: the NCAA Concussion Study. *Journal of the American Medical Association*, 290(19), 2549-2555.
- Herman, J. L. (1992). Complex PTSD: A syndrome in survivors of prolonged and repeated trauma. *Journal of Traumatic Stress*, 5(3), 377-391. doi:10.1002/jts.2490050305
- Holt, S., Buckley, H., & Whelan, S. (2008). The impact of exposure to domestic violence on children and young people: A review of the literature. *Child Abuse & Neglect*, 32(8), 797-810. doi:https://doi.org/10.1016/j.chiabu.2008.02.004
- House of Commons. (2017). *UK Prison Population Statistics : Briefing Paper number SN/SG/04334*. UK: House of Commons Library Retrieved from <http://researchbriefings.files.parliament.uk/documents/SN04334/SN04334.pdf>.
- Howard, R., Karatzias, T., Power, K., & Mahoney, A. (2017). Posttraumatic stress disorder (PTSD) symptoms mediate the relationship between substance misuse and violent offending among female prisoners. *Social Psychiatry and Psychiatric Epidemiology*, 52(1), 21-25.
- Jackson, H., Philp, E., Nuttall, R. L., & Diller, L. (2002). Traumatic brain injury: A hidden consequence for battered women. *Professional Psychology: Research and Practice*, 33(1), 39-45. doi:10.1037/0735-7028.33.1.39

- Kubany, E. S., Haynes, S. N., Leisen, M. B., Owens, J. A., Kaplan, A. S., Watson, S. B., & Burns, K. (2000). Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: the Traumatic Life Events Questionnaire. *Psychological Assessment*, 12(2), 210-224.
- Kwako, L. E., Glass, N., Campbell, J., Melvin, K. C., Barr, T., & Gill, J. M. (2011). Traumatic brain injury in intimate partner violence: a critical review of outcomes and mechanisms. *Trauma Violence Abuse*, 12(3), 115-126. doi:10.1177/1524838011404251
- McGinley, A. (2017). *Validating the Brain Injury Screening Index (BISI) and the Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID) as screening tools for head injury in a Scottish prison setting: and clinical research portfolio*. (D Clin Psy Thesis), University of Glasgow, Retrieved from <http://theses.gla.ac.uk/8476/>
- Merbitz, C., Jain, S., Good, G. L., & Jain, A. (1995). Reported head injury and disciplinary rule infractions in prison. *Journal of Offender Rehabilitation*, 22(3-4), 11-19. doi:10.1300/J076v22n03\_02
- National Prisoner Healthcare Network. (2016). *Brain Injury and Offending* Retrieved from <http://www.nphn.scot.nhs.uk/wp-content/uploads/2016/07/NPHN-Brain-Injury-and-Offending-Final-Report.pdf>.
- O'Sullivan, M., Glorney, E., Sterr, A., Oddy, M., & da Silva Ramos, S. (2015). Traumatic brain injury and violent behavior in females: A systematic review. *Aggression and Violent Behavior*, 25(Part A), 54-64. doi:10.1016/j.avb.2015.07.006
- Schofield, P. W., Malacova, E., Preen, D. B., D'Este, C., Tate, R., Reekie, J., Wand, H. & Butler, T. (2015). Does traumatic brain injury lead to

criminality? A whole-population retrospective cohort study using linked data. *PLoS one*, 10(7), e0132558.

Scottish Government. (2012). *Scottish Index of multiple deprivation 2012*. In *A National Statistics Publication for Scotland* (pp. 117 p.). Retrieved from <http://simd.scotland.gov.uk/publication-2012/>

Scottish Prison Service. (2018). SPS Prison Population. Retrieved from <http://www.sps.gov.uk/Corporate/Information/SPSPopulation.aspx>

Shiroma, E. J., Ferguson, P. L., & Pickelsimer, E. E. (2010). Prevalence of traumatic brain injury in an offender population: a meta-analysis. *Journal of Correctional Health Care*, 16(2), 147-159.  
doi:10.1177/1078345809356538

Shivaji, T., Lee, A., Dougall, N., McMillan, T., & Stark, C. (2014). The epidemiology of hospital treated traumatic brain injury in Scotland. *BMC Neurology*, 14, 2. doi:10.1186/1471-2377-14-2

Tagliaferri, F., Compagnone, C., Korsic, M., Servadei, F., & Kraus, J. (2006). A systematic review of brain injury epidemiology in Europe. *Acta Neurochirurgica (Wien)*, 148(3), 255-268; discussion 268.  
doi:10.1007/s00701-005-0651-y

Weathers, F. W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). The PTSD Checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD at [www.ptsd.va.gov](http://www.ptsd.va.gov).

Whelan-Goodinson, R., Ponsford, J., & Schönberger, M. (2009). Validity of the Hospital Anxiety and Depression Scale to assess depression and anxiety following traumatic brain injury as compared with the Structured Clinical Interview for DSM-IV. *Journal of Affective Disorders*, 114(1-3), 94-102.



- Williams, W. H., Chitsabesan, P., Fazel, S., McMillan, T., Hughes, N., Parsonage, M., & Tonks, J. (2018). Traumatic brain injury: a potential cause of violent crime? *Lancet Psychiatry*. doi:10.1016/s2215-0366(18)30062-2
- Williams, W. H., Mewse, A. J., Tonks, J., Mills, S., Burgess, C. N., & Cordan, G. (2010). Traumatic brain injury in a prison population: prevalence and risk for re-offending. *Brain Injury*, 24(10), 1184-1188.
- World Health Organization. (1992). *The ICD-10 classification of mental and behavioural disorders : clinical descriptions and diagnostic guidelines*. Geneva: World Health Organization.
- Wortzel, H. S., & Arciniegas, D. B. (2013). A forensic neuropsychiatric approach to traumatic brain injury, aggression, and suicide. *Journal of the American Academy of Psychiatry and the Law*, 41(2), 274-286.
- Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-370.

Author guidelines- The Journal of Forensic Psychiatry & Psychology

**About the Journal**

*The Journal of Forensic Psychiatry & Psychology* is an international, peer-reviewed journal publishing high-quality, original research. Please see the journal's [Aims & Scope](#) for information about its focus and peer-review policy.

Please note that this journal only publishes manuscripts in English.

*The Journal of Forensic Psychiatry & Psychology* accepts the following types of article:

- original manuscripts
- case reports
- brief reports
- review articles
- book reviews
- review essays

**Peer Review**

Taylor & Francis is committed to peer-review integrity and upholding the highest standards of review. Once your paper has been assessed for suitability by the editor, it will then be double blind peer reviewed by independent, anonymous expert referees. Find out more about [what to expect during peer review](#) and read our guidance on [publishing ethics](#).

**Preparing Your Paper**

**review articles**

- Should be written with the following elements in the following order: title page (including Acknowledgements as well as Funding and grant-awarding bodies); abstract; keywords; main text; references; appendices (as appropriate); table(s) with caption(s) (on individual pages); figure caption(s) (as a list).
- Should contain a structured abstract of 200 words.
- Between 3 and 6 **keywords**. Read [making your article more discoverable](#), including information on choosing a title and search engine optimization. Review papers (e.g. systematic reviews, meta-analyses, law reviews) and some empirical studies may require greater length than regular articles and the Editors are happy to receive longer papers. We encourage brevity in reporting research. Please include a word count.

**Style Guidelines**

Please refer to these [quick style guidelines](#) when preparing your paper, rather than any published articles or a sample copy.

Any spelling style is acceptable so long as it is consistent within the manuscript.

Please use single quotation marks, except where ‘a quotation is “within” a quotation’.

Please note that long quotations should be indented without quotation marks.

### Formatting and Templates

Papers may be submitted in Word format. Figures should be saved separately from the text. To assist you in preparing your paper, we provide formatting template(s). [Word templates](#) are available for this journal. Please save the template to your hard drive, ready for use. If you are not able to use the template via the links (or if you have any other template queries) please contact us [here](#).

### References

Please use this [reference guide](#) when preparing your paper.

An [EndNote output style](#) is also available to assist you.

### Checklist: What to Include

1. **Author details.** All authors of a manuscript should include their full name and affiliation on the cover page of the manuscript. Where available, please also include ORCiDs and social media handles (Facebook, Twitter or LinkedIn). One author will need to be identified as the corresponding author, with their email address normally displayed in the article PDF (depending on the journal) and the online article. Authors' affiliations are the affiliations where the research was conducted. If any of the named co-authors moves affiliation during the peer-review process, the new affiliation can be given as a footnote. Please note that no changes to affiliation can be made after your paper is accepted. [Read more on authorship](#).
2. You can opt to include a **video abstract** with your article. [Find out how these can help your work reach a wider audience, and what to think about when filming](#).
3. **Funding details.** Please supply all details required by your funding and grant-awarding bodies as follows:  
*For single agency grants*  
This work was supported by the [Funding Agency] under Grant [number xxxx].  
*For multiple agency grants*  
This work was supported by the [Funding Agency #1] under Grant [number xxxx];

[Funding Agency #2] under Grant [number xxxx]; and [Funding Agency #3] under Grant [number xxxx].

4. **Disclosure statement.** This is to acknowledge any financial interest or benefit that has arisen from the direct applications of your research. [Further guidance on what is a conflict of interest and how to disclose it.](#)
5. **Data availability statement.** If there is a data set associated with the paper, please provide information about where the data supporting the results or analyses presented in the paper can be found. Where applicable, this should include the hyperlink, DOI or other persistent identifier associated with the data set(s). [Templates](#) are also available to support authors.
6. **Data deposition.** If you choose to share or make the data underlying the study open, please deposit your data in a [recognized data repository](#) prior to or at the time of submission. You will be asked to provide the DOI, pre-reserved DOI, or other persistent identifier for the data set.
7. **Geolocation information.** Submitting a geolocation information section, as a separate paragraph before your acknowledgements, means we can index your paper's study area accurately in JournalMap's geographic literature database and make your article more discoverable to others. [More information.](#)
8. **Supplemental online material.** Supplemental material can be a video, dataset, fileset, sound file or anything which supports (and is pertinent to) your paper. We publish supplemental material online via Figshare. Find out more about [supplemental material and how to submit it with your article.](#)
9. **Figures.** Figures should be high quality (1200 dpi for line art, 600 dpi for grayscale and 300 dpi for colour, at the correct size). Figures should be supplied in one of our preferred file formats: EPS, PS, JPEG, GIF, or Microsoft Word (DOC or DOCX). For information relating to other file types, please consult our [Submission of electronic artwork](#) document.
10. **Tables.** Tables should present new information rather than duplicating what is in the text. Readers should be able to interpret the table without reference to the text. Please supply editable files.
11. **Equations.** If you are submitting your manuscript as a Word document, please ensure that equations are editable. More information about [mathematical symbols and equations.](#)
12. **Units.** Please use [SI units](#) (non-italicized).

### Using Third-Party Material in your Paper

You must obtain the necessary permission to reuse third-party material in your article. The use of short extracts of text and some other types of material is usually permitted,

on a limited basis, for the purposes of criticism and review without securing formal permission. If you wish to include any material in your paper for which you do not hold copyright, and which is not covered by this informal agreement, you will need to obtain written permission from the copyright owner prior to submission. More information on [requesting permission to reproduce work\(s\) under copyright](#).

### Submitting Your Paper

This journal uses ScholarOne Manuscripts to manage the peer-review process. If you haven't submitted a paper to this journal before, you will need to create an account in ScholarOne. Please read the guidelines above and then submit your paper in [the relevant Author Centre](#), where you will find user guides and a helpdesk.

Please note that *The Journal of Forensic Psychiatry & Psychology* uses [Crossref™](#) to screen papers for unoriginal material. By submitting your paper to *The Journal of Forensic Psychiatry & Psychology* you are agreeing to originality checks during the peer-review and production processes.

On acceptance, we recommend that you keep a copy of your Accepted Manuscript. Find out more about [sharing your work](#).

*Updated 16-05-2018*

*Taken from:*

<https://www.tandfonline.com/action/authorSubmission?show=instructions&journalCode=rjfp20>

## Database Search Strategies

### PsycINFO Search Strategy

1. TI ( (child\* N2 (neglect\* OR abus\* OR trauma\* OR maltreat\*)) OR (adverse N2 experience\*) ) OR AB ( (child\* N2 (neglect\* OR abus\* OR trauma\* OR maltreat\*)) OR (adverse N2 experience\*) ) OR KW ( (child\* N2 (neglect\* OR abus\* OR trauma\* OR maltreat\*)) OR (adverse N2 experience\*) )
2. TI ( victimi\* OR rape\* OR IPV OR GBV OR CSA OR ((physical\* OR emotional\* OR sex\* OR partner\* OR intimate OR domestic OR multiple OR chronic OR gender\* OR histor\*) N2 (abus\* OR violen\* OR trauma\*)) OR hostage\* OR prostitut\* OR slave\* OR torture\* OR traffic\* OR refugee\* ) OR AB (victimi\* OR rape\* OR IPV OR GBV OR CSA OR ((physical\* OR emotional\* OR sex\* OR partner\* OR intimate OR domestic OR multiple OR chronic OR gender\* OR histor\*) N2 (abus\* OR violen\* OR trauma\*)) OR hostage\* OR prostitut\* OR slave\* OR torture\* OR traffic\* OR refugee\* ) OR KW ( victimi\* OR rape\* OR IPV OR GBV OR CSA OR ((physical\* OR emotional\* OR sex\* OR partner\* OR intimate OR domestic OR multiple OR chronic OR gender\* OR histor\*) N2 (abus\* OR violen\* OR trauma\*)) OR hostage\* OR prostitut\* OR slave\* OR torture\* OR traffic\* OR refugee\* )
3. TI ( PTSD OR "post traumatic stress disorder" OR "posttraumatic stress disorder" OR CPTSD OR "developmental trauma" OR "complex trauma\*" OR DESNOS OR "extreme stress" OR "dissociative disorder" OR BPD OR "borderline personality" OR (emotion\* N2 dysregulat\*) ) OR AB ( PTSD OR "post traumatic stress disorder" OR "posttraumatic stress disorder" OR CPTSD OR "developmental trauma" OR "complex trauma\*" OR DESNOS OR "extreme stress" OR "dissociative disorder" OR BPD OR "borderline personality" OR (emotion\* N2 dysregulat\*) ) OR KW ( PTSD OR "post traumatic stress disorder" OR "posttraumatic stress disorder" OR CPTSD OR "developmental trauma" OR "complex trauma\*" OR DESNOS OR "extreme stress" OR "dissociative disorder" OR BPD OR "borderline personality" OR (emotion\* N2 dysregulat\*) )
4. ((((((((((((((DE "Emotional Trauma") OR(DE "Posttraumatic Stress Disorder" OR DE "Complex PTSD" OR DE "DESNOS" OR DE "Post-Traumatic Stress")) OR (DE "Borderline Personality Disorder")) OR (DE "Attachment Disorders")) OR (DE "Child Abuse" OR DE "Child Neglect")) OR(DE "Domestic Violence" OR DE "Emotional Abuse" OR DE "Physical Abuse" OR

- DE "Sexual Abuse")) OR (DE "Rape")) OR (DE "Hostages")) OR (DE "Torture")) OR (DE "Human Trafficking")) OR (DE "Life Experiences")) OR (DE "Early Experience")) OR (DE "Battered Females")) OR (DE "Intimate Partner Violence")) OR (DE "Partner Abuse")) OR (DE "Slavery")
5. S1 OR S2 OR S3 OR S4
  6. (((DE "Female Criminals") OR (DE "Human Sex Differences")) OR (DE "Female Delinquency"))
  7. TI ( (women OR woman OR female\*) N2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*) ) OR AB ( (women OR woman OR female\*) N2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*) ) OR KW ( (women OR woman OR female\*) N2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*) )
  8. S6 OR S7
  9. S5 AND S8

## EMBASE

- 1 ((child\* adj2 (neglect\* or abus\* or trauma\* or maltreat\*)) or (adverse adj2 experience\*)).ti,ab,kw.
- 2 partner violence/ or battered woman/ or slavery/ or human trafficking/ or torture/ or rape/ or acquaintance rape/ or attempted rape/ or marital rape/ or hostage/ or emotional abuse/ or sexual abuse/ or psychosocial disorder/ or borderline state/ or child abuse/ or domestic violence/ or child abuse survivor/ or child neglect/ or child sexual abuse/ or posttraumatic stress disorder/ or psychotrauma/
- 3 (victim\* or rape\* or ((physical\* or emotional\* or sex\* or partner\* or intimate or domestic or multiple or chronic or gender\* or histor\*) adj2 (abus\* or violen\* or trauma\*)) or hostage\* or prostitut\* or slave\* or torture\* or traffick\* or refugee\*).ti,ab,kw.

- 4 (PTSD or "post traumatic stress disorder" or "posttraumatic stress disorder" or CPTSD or "developmental trauma" or "complex trauma" or DESNOS or "extreme stress" or "dissociative disorder" or BPD or "borderline personality" or (emotion\* adj2 dysregulat\*)).ti,ab,kw.
- 5 ((women or woman or female\*) adj2 (arrest\* or delinquen\* or inmate\* or incarcerat\* or perp\* or crim\* or prison\* or imprison\* or offend\* or remand\* or correctional or probat\* or penitentiari\* or recidivism or reoffend\* or re-offend\* or homicid\* or jail\* or Gaol\*)).ti,ab,kw.
- 6 1 or 2 or 3 or 4
- 7 5 and 6

## Medline

- 15 13 and 14
- 14 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12  
((women or woman or female\*) adj2 (arrest\* or delinquen\* or inmate\* or incarcerat\* or perp\*  
13 or crim\* or prison\* or imprison\* or offend\* or remand\* or correctional or probat\* or  
penitentiari\* or recidivism or reoffend\* or re-offend\* or homicid\* or jail\* or Gaol\*)).ti,ab,kw.  
(PTSD or "post traumatic stress disorder" or "posttraumatic stress disorder" or CPTSD or  
12 "developmental trauma" or "complex trauma" or DESNOS or "extreme stress" or "dissociative  
disorder" or BPD or "borderline personality" or (emotion\* adj2 dysregulat\*)).ti,ab,kw.  
(victim\* or rape\* or ((physical\* or emotional\* or sex\* or partner\* or intimate or domestic or  
11 multiple or chronic or gender\* or histor\*) adj2 (abus\* or violen\* or trauma\*)) or hostage\* or  
prostitut\* or slave\* or torture\* or traffick\* or refugee\*).ti,ab,kw.  
((child\* adj2 (neglect\* or abus\* or trauma\* or maltreat\*)) or (adverse adj2  
10 experience\*)).ti,ab,kw.
- 9 Reactive Attachment Disorder/
- 8 Dissociative Disorders/ or Borderline Personality Disorder/
- 7 "Adult Survivors of Child Abuse"/ or Dissociative Disorders/
- 6 battered child syndrome/ or psychological trauma/ or stress disorders, post-traumatic/
- 5 Battered Women/



- 4 rape/ or physical abuse/
- 3 human trafficking/ or slavery/
- 2 domestic violence/ or child abuse/ or child abuse, sexual/ or spouse abuse/ or gender-based violence/ or intimate partner violence/ or physical abuse/ or rape/ or torture/
- 1 Stress Disorders, Post-Traumatic/ or Psychological Trauma/

### OpenGrey (GREY LITERATURE)

(women OR woman OR female\*) NEAR/2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*)

abstract:(women OR woman OR female\*) NEAR/2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*)

### Pilots (Proquest) search

ab(((women OR woman OR female\*) NEAR/2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*))) OR ti(((women OR woman OR female\*) NEAR/2 (arrest\* OR delinquen\* OR inmate\* OR incarcerat\* OR perp\* OR crim\* OR prison\* OR imprison\* OR offend\* OR remand\* OR correctional OR probat\* OR penitentiari\* OR recidivism OR reoffend\* OR re-offend\* OR homicid\* OR jail\* OR Gaol\*)))

### CINAHL search

- |     |  |
|-----|--|
| S18 | S15 AND S16  |
| S17 | S15 AND S16  |
| S16 | S11 OR S12 OR S13 OR S14   |
| S15 | TI ( (women OR woman OR female*) N2 (arrest* OR delinquen* OR inmate* OR incarcerat* OR perp* OR crim* OR prison* OR imprison* OR offend* OR remand* OR correctional OR probat* OR penitentiari* OR recidivism OR reoffend* OR re-offend* OR homicid* OR jail* OR Gaol*) ) OR AB ( (women OR woman OR female*) N2 (arrest* OR delinquen* OR inmate* OR incarcerat* OR perp* OR crim* OR prison* OR imprison* OR offend* OR remand* OR correctional OR probat* OR penitentiari* OR recidivism OR reoffend* OR re-offend* OR homicid* OR jail* OR Gaol*) ) |

- S14 TI ( (child\* N2 (neglect\* OR abus\* OR trauma\* OR maltreat\*)) OR (adverse N2 experience\*) ) AND AB ( (child\* N2 (neglect\* OR abus\* OR trauma\* OR maltreat\*)) OR (adverse N2 experience\*) )
- S13 TI ( victimi\* OR rape\* OR IPV OR GBV OR CSA OR ((physical\* OR emotional\* OR sex\* OR partner\* OR intimate OR domestic OR multiple OR chronic OR gender\* OR histor\*) N2 (abus\* OR violen\* OR trauma\*)) OR hostage\* OR prostitut\* OR slave\* OR torture\* OR traffic\* OR refugee\* ) OR AB ( victimi\* OR rape\* OR IPV OR GBV OR CSA OR ((physical\* OR emotional\* OR sex\* OR partner\* OR intimate OR domestic OR multiple OR chronic OR gender\* OR histor\*) N2 (abus\* OR violen\* OR trauma\*)) OR hostage\* OR prostitut\* OR slave\* OR torture\* OR traffic\* OR refugee\* )
- S12 TI ( PTSD OR "post traumatic stress disorder" OR "posttraumatic stress disorder" OR CPTSD OR "developmental trauma" OR "complex trauma\*" OR DESNOS OR "extreme stress" OR "dissociative disorder" OR BPD OR "borderline personality" OR (emotion\* N2 dysregulat\*) ) OR AB ( PTSD OR "post traumatic stress disorder" OR "posttraumatic stress disorder" OR CPTSD OR "developmental trauma" OR "complex trauma\*" OR DESNOS OR "extreme stress" OR "dissociative disorder" OR BPD OR "borderline personality" OR (emotion\* N2 dysregulat\*)
- S11 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10
- S10 (MH "Hostages")
- S9 (MH "Life Experiences")
- S8 (MH "Torture")
- S7 (MH "Human Trafficking")
- S6 (MH "Rape") OR (MH "Sexual Abuse")
- S5 (MH "Domestic Violence") OR (MH "Exposure to Violence") OR (MH "Dating Violence")
- S4 (MH "Intimate Partner Violence")
- S3 (MH "Child Abuse") OR (MH "Child Abuse, Sexual") OR (MH "Child Abuse Survivors")
- S2 (MH "Borderline Personality Disorder")
- S1 (MH "Stress Disorders, Post-Traumatic")

## Appendix 2.1

### Author guidelines for submission to Journal of Head Trauma Rehabilitation

#### SCOPE

The *Journal of Head Trauma Rehabilitation (JHTR)* is a bimonthly journal devoted to presenting scientific information on restoring function and limiting disability due to traumatic brain injury (TBI). The primary aim of JHTR is to disseminate original research to professionals from multiple disciplines who study and/or treat persons who have experienced a TBI. All published research manuscripts receive masked peer review.

Articles appearing in JHTR address functional effects of TBI and interventions intended to ameliorate those effects. Findings should inform the treatment of individuals and families affected by TBI, the systems of care in which services are provided, or the epidemiologic and public health issues relevant to TBI. Manuscripts are expected to address questions that would

be of interest to the wide range of professionals involved in TBI care--articles that are narrowly focused or relevant to only a single discipline typically are not published.

Populations of interest. Research reported in JHTR is generally limited to human subjects with a history of TBI, the families and caregivers of individuals with TBI, and/or the systems of care in which TBI services and research are undertaken. Studies may address injuries of any severity, sustained by any age group. If a study's sample includes individuals with acquired brain injuries other than TBI, analyses must be included to confirm that the findings reported for the entire sample are specifically true for those with a history of TBI.

Case ascertainment. Procedures used to determine that participants incurred a TBI must employ proven clinical techniques or validated research methods of TBI identification.

Transparency and openness. Please state in the article whether data, programming code or other materials are available to other researchers and, if so, how to access them. Data or code that was not the authors' own should be cited in the text and listed in the reference section.

Randomized controlled trials must be preregistered on *clinicaltrials.gov* or similar independent, institutional registry, prior to the initiation of data collection. Preregistration, including of pre-analysis plans, is recommended for all study designs. If a trial is preregistered, a link to the registry should be provided in the main text.

Inclusion of diverse participants. Please provide sex or gender-specific and racial/ethnic-specific data in describing the outcomes of experimental and observational analyses, or specifically state that no sex-based or racial/ethnic-based differences were present. Where applicable, authors should explain why people of a particular age, race, ethnicity, gender or sex were excluded from a study.

The term "sex" should be used as a classification, generally as male or female, according to the reproductive organs and functions that derive from the chromosomal complement. In the study of human subjects, the term "gender" should be used to refer to a person's self-representation as male or female, or how that person is responded to by social institutions on the basis of the individual's gender presentation.

## **MANUSCRIPT SUBMISSION**

**Article types:** Original articles may employ experimental, observational or qualitative designs. JHTR will publish replication studies. Systematic reviews, scoping reviews and meta-analyses are also of interest.

Commentaries and Letters to the Editor will be reviewed and accepted at the discretion of the Editors. Other special communications must be discussed with the Editor-in-Chief prior to submission.

Investigations of the efficacy of interventions using only quasi-experimental designs typically are not accepted. Case studies or case series, unless they address a seminal clinical condition or procedure that has not been previously reported in the published literature, will not be reviewed.

Authors are strongly encouraged to consult relevant guidelines for research reporting found at <[www.equatornetwork.org](http://www.equatornetwork.org)>. Authors have the option of uploading a completed checklist with page and line numbers indicated for each criterion met.

Unless an author has been invited by an issue editor to submit a manuscript for a topical issue, all original research should be submitted as "Unsolicited (Focus on Clinical Research)".

**Article length:** Manuscripts should not exceed 3500 words excluding abstract, references, tables, and figure legends. If the author(s) feels a longer manuscript is necessary, please contact the Editor-in-Chief in advance of submission. Typically, except for review articles, the number of references should not exceed 50. Authors are encouraged to use Supplemental Digital Content (SDC) for manuscript details that enhance but are not central to the comprehension of the paper. SDC is linked to the article indefinitely via the *JHTR* website (for more information, see description below).

As of 2016, *JHTR* will accept brief reports that do not exceed 2000 words, 3 tables and/or figures and 15 references.

**Online manuscript submission:** All manuscripts must be submitted online through the Web site at [www.edmgr.com/jhtr](http://www.edmgr.com/jhtr), which can also be accessed through the journal's Web page.

**First-time users:** Please click the Register button from the menu above and enter the requested information. On successful registration, you will be sent an e-mail indicating your user name and password. *Note:* If you have received an e-mail from us with an assigned user ID and password, or if you are a repeat user, do not register again. Just log in. Once you have an assigned ID and password, you do not have to reregister, even if your status changes (ie, author, reviewer, or editor).

**Authors:** Please click the Log-in button from the menu at the top of the page and log-in to the system as an Author. Submit your manuscript according to the author instructions. You will be able to track the progress of your manuscript through the system. If you experience any problems, please contact John D. Corrigan, PhD, Editor-in-Chief at [corrigan.1@osu.edu](mailto:corrigan.1@osu.edu).

#### **CONFLICTS OF INTEREST**

Authors must state all possible conflicts of interest in the Title Page of the manuscript, including financial, consultant, institutional, and other relationships that might lead to bias or a conflict of interest. If there is no conflict of interest, this should also be explicitly stated as none declared. All relevant conflicts of interest and sources of funding should be included on the title page of the manuscript with the heading "Conflicts of Interest and Source of Funding:". For example:

**Conflicts of Interest and Source of Funding:** Author A has received honoraria from Company Z. Author B is currently receiving a grant (#12345) from Organization Y and is on the speaker's bureau for Organization X—the CME organizers for Company A. For the remaining authors none were declared.

In addition, each author must complete and submit the journal's copyright transfer agreement, which includes a section on the disclosure of potential conflicts of interest based on the recommendations of the International Committee of Medical Journal Editors, "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" ([www.icmje.org/update.html](http://www.icmje.org/update.html)).

A copy of the form is made available to the submitting author within the Editorial Manager submission process. Co-authors will automatically receive an Email with instructions on completing the form upon submission.

#### **LWW AUTHOR'S MANUSCRIPT CHECKLIST FOR JOURNALS**

Authors should pay particular attention to the following items before submitting their manuscripts:

**Manuscript Preparation**

- *JHTR* uses the *American Medical Association Manual of Style*, 10th edition.
- *JHTR* requires authors to use person-first language—avoid phrasing such as “the brain-injured participant” or the “TBI patient” and replace with “participant with a brain injury” or “patient with a TBI.”
- Manuscripts should be line numbered in their original format (eg, Microsoft Word line numbering).
- Manuscripts should be double-spaced, including quotations, lists, references, footnotes, figure captions, and all parts of tables. Do not embed tables in the text.
- Manuscripts should be ordered as follows: title page, abstracts, text, references, appendices, tables, and any illustrations.
- To maintain a masked review process, it is the author’s responsibility to make every attempt to mask all information in the manuscript that would reveal the identity of the author to the reviewer. This version of the manuscript is referred to as the “masked” manuscript when uploading documents.
- An accompanying cover letter should include attestations that (1) the work is original and has not been published or under review elsewhere; (2) all authors contributed to the work; and (3) the research was conducted consistent with ethical guidelines for the conduct of research.
- The cover letter should also summarize any conflicts of interest affecting any authors.
- Title page including (1) title of the article; (2) author names (with highest academic degrees) and affiliations (including titles, departments, and name and location of institutions of primary employment); (3) all possible conflicts of interest including financial, consultant, institutional, and other relationships that might lead to bias or a conflict of interest; (4) disclosure of funding received for this work including from any of the following organizations with public or open access policies: National Institutes of Health (NIH), National Institute on Disability Independent Living and Rehabilitation Research, Veterans Administration, Wellcome Trust, and the Howard Hughes Medical Institute; and (5) any acknowledgments, credits, or disclaimers.
- A structured abstract of no more than 200 words should be prepared. Authors should use telegraphic language where possible, including omission of introductory clauses. Headings should typically include the following: Objective, Setting, Participants, Design, Main Measures, Results, and Conclusion. The Conclusion section should encapsulate the clinical implications of the results, not merely restate the findings.
- Include up to 10 key words that describe the contents of the article such as those that appear in the Cumulative Index to Nursing and Allied Health Literature (CINAHL) or the National Library of Medicine’s (NLM’s) Medical Subject Headings (MeSH).
- There should be a clear indication of the placement of all tables and figures in text.
- The author is responsible for obtaining written permission for any borrowed text, tables, or figures.

**References**

- References must be cited in text and styled in the reference list according to the *American Medical Association Manual of Style*, 10th edition, copyright 2007 American Medical Association. They must be numbered consecutively in the order they are cited and listed in that sequence (not alphabetically); reference numbers may be used more than once throughout an article. Page numbers should appear with the text

citation following a specific quote. References should be double-spaced and placed at the end of the text.

- References should not be created using Microsoft Word's automatic footnote/endnote feature.

## **Figures**

### **A. Four Steps for Submitting Artwork**

1. Learn about Digital Art creation [here](#).
2. Create, Scan, and Save your artwork according to the Digital Artwork Guideline Checklist.
3. Upload each figure to Editorial Manager in conjunction with your manuscript text and tables.

**B. Color Figures:** The journal accepts color figures for publication that will enhance an article. Authors who submit color figures will receive an estimate of the cost for color reproduction in print. If they decide not to pay for color reproduction in print, they can request that the figures be converted to black and white at no charge. All color figures can appear in color in the online version of the journal at no charge. (Note: this includes the online version on the journal website and Ovid, but not the iPad edition currently.)

### **C. Digital Artwork Guideline Checklist Basics to have in place before submitting your digital art.**

- Artwork saved as JPG, TIFF and EPS files. Do not save TIFFs as compressed files.
- Artwork created as the actual size (or slightly larger) than it will appear in the journal. (To get an idea of the size images should be when they print, study a copy of the journal. Measure the artwork typically shown and scale your image to match.)
- Crop out any white or black space surrounding the image.
- Text and fonts in any figure are one of the acceptable fonts: Helvetica, Times Roman, Symbol, Mathematical PI, and European PI.
- Color images are created/scanned and saved and submitted as CMYK only. Do not submit any figures in RGB mode because RGB is the color mode used for screens/monitors and CMYK is the color mode used for print.
- Line art saved at a resolution of at least 1200 dpi.
- Images saved at a resolution of at least 300 dpi.
- Each figure saved as a separate file and saved separately from the accompanying text file.
- For multipanel or composite figures only: Any figure with multiple parts should be sent as one file, with each part labeled the way it is to appear in print.

### **Remember:**

- Artwork generated from office suite programs such as CorelDRAW, MS Word, Excel, and artwork downloaded from the Internet (JPEG or GIF files) cannot be used because the quality is poor when printed.
- Cite figures consecutively in your manuscript.
- Number figures in the figure legend in the order in which they are discussed.

- Upload figures consecutively to the Editorial Manager Web site and number figures consecutively in the Description box during upload.
- All electronic art that cannot be successfully uploaded must be submitted on a 3 1/2-inch high-density disk, a CD-ROM, or an Iomega Zip disk, accompanied by high-resolution laser prints of each image.

**Tables** Tables should be on a separate page at the end of the manuscript. Number tables consecutively and supply a brief title for each. Include explanatory footnotes for all nonstandard abbreviations. Cite each table in the text in consecutive order. If you use data from another published or unpublished source, obtain permission and acknowledge fully.

**Supplemental Digital Content** Authors may submit SDC that enhances their article's text to be considered for online posting. SDC may include standard media such as text documents, graphs, audio, video, etc. On the Attach Files page of the submission process, please select Supplemental Audio, Video, or Data for your uploaded file as the Submission Item. If an article with SDC is accepted, our production staff will create a URL with the SDC file. The URL will be placed in the call-out within the article. SDC files are not copyedited by LWW staff; they will be presented digitally as submitted. For a list of all available file types and detailed instructions, please visit the Checklist for Supplemental Digital Content.

**SDC Call-outs:** SDC must be cited consecutively in the text of the submitted manuscript. Citations should include the type of material submitted (Audio, Figure, Table, etc.), be clearly labeled as "Supplemental Digital Content," include the sequential list number and provide a description of the supplemental content. All descriptive text should be included in the call-out, as it will not appear elsewhere in the article.

Example:

We performed many tests on the degrees of flexibility in the elbow (see Video, Supplemental Digital Content 1, which demonstrates elbow flexibility) and found our results inconclusive.

**List of Supplemental Digital Content:** A listing of SDC items must be submitted at the end of the manuscript file. Include the SDC number and file type. This text will be removed by our production staff and not be published.

Example:

Supplemental Digital Content 1. wmv

**SDC File Requirements:** All acceptable file types are permissible up to 10 MB. For audio or video files greater than 10 MB, authors should first query the journal office for approval. For a list of all available file types and detailed instructions, please visit the Checklist for Supplemental Digital Content.

### **Permissions**

Authors are responsible for obtaining signed letters from copyright holders granting permission to reprint material being borrowed or adapted from other sources, including previously published material of your own. Authors must obtain written permission for material that has not been created and submitted to LWW for a specific publication (including forms, checklists, cartoons, text, tables, figures, exhibits, glossaries, and pamphlets); concepts, theories, or formulas used exclusively in a chapter or section; direct quotes from a book or journal that are more than 30% of a printed page; and all excerpts from newspapers or other short articles. Without written permission from the copyright holder, these items may not be used. Where permission has been granted, the author should follow any special wording stipulated by the granter when attributing the source in the manuscript. Letters of permission must be submitted before publication of the manuscript.

**Open access**

Authors of accepted peer-reviewed articles have the choice to pay a fee to allow perpetual unrestricted online access to their published article to readers globally, immediately upon publication. Authors may take advantage of the open access option at the point of acceptance to ensure that this choice has no influence on the peer review and acceptance process. These articles are subject to the journal's standard peer-review process and will be accepted or rejected based on their own merit.

The article processing charge (APC) is charged on acceptance of the article and should be paid within 30 days by the author, funding agency or institution. Payment must be processed for the article to be published open access. For a list of journals and pricing please visit our [Wolters Kluwer Open Health Journals page](#).

**Authors retain copyright**

Authors retain their copyright for all articles they opt to publish open access. Authors grant Wolters Kluwer an exclusive license to publish the article and the article is made available under the terms of a Creative Commons user license. Please visit our [Open Access Publication Process page](#) for more information.

**Creative Commons license**

Open access articles are freely available to read, download and share from the time of publication under the terms of the [Creative Commons License Attribution-Non-commercial No Derivative \(CC BY-NC-ND\) license](#). This license does not permit reuse for any commercial purposes nor does it cover the reuse or modification of individual elements of the work (such as figures, tables, etc.) in the creation of derivative works without specific permission.

**Compliance with funder mandated open access policies**

An author whose work is funded by an organization that mandates the use of the [Creative Commons Attribution \(CC BY\) license](#) is able to meet that requirement through the available open access license for approved funders. Information about the approved funders can be found here: <http://www.wkopenhealth.com/inst-fund.php>

**FAQ for open access**

<http://www.wkopenhealth.com/openaccessfaq.php>

**Appendix 2.2****Letter of ethical approval from NHS**



**WoSRES**  
West of Scotland Research Ethics Service



Professor Tom McMillan  
Institute of Health & Wellbeing, University of  
Glasgow  
1st Floor Administration Building  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow  
G12 0XH

**West of Scotland REC 5**

West of Scotland Research Ethics Service  
West Glasgow Ambulatory Care Hospital  
Dalmair Street  
Glasgow  
G3 8SJ

Date 05 December 2017

Direct line 0141 232 1809

E-mail [WoSREC5@ggc.scot.nhs.uk](mailto:WoSREC5@ggc.scot.nhs.uk)

Dear Professor McMillan

**Study title:** Head Injury in Female Prisoners: Epidemiology, Impact  
and Disability  
**REC reference:** 17/WS/0230  
**IRAS project ID:** 230707

Thank you for responding to the Committee's request for further information on the  
above research and submitting revised documentation.

The further information was considered in correspondence by a Sub-Committee of the REC. A  
list of the Sub-Committee members is attached.

We plan to publish your research summary wording for the above study on the HRA website,  
together with your contact details. Publication will be no earlier than three months from the date  
of this opinion letter. Should you wish to provide a substitute contact point, require further  
information, or wish to make a request to postpone publication, please contact |  
[hra.studyregistration@nhs.net](mailto:hra.studyregistration@nhs.net) outlining the reasons for your request.

**Confirmation of ethical opinion**

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above  
research on the basis described in the application form, protocol and supporting documentation  
as revised, subject to the conditions specified below.

**Conditions of the favourable opinion**

The REC favourable opinion is subject to the following conditions being met prior to the start of  
the study.

Management permission must be obtained from each host organisation prior to the start of the  
study at the site concerned.

*Management permission should be sought from all NHS organisations involved in the study in  
accordance with NHS research governance arrangements. Each NHS organisation must*

confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for NHS permission for research is available in the Integrated Research Application System, [www.hra.nhs.uk](http://www.hra.nhs.uk) or at <http://www.rdforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations

#### **Registration of Clinical Trials**

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact [hra.studyregistration@nhs.net](mailto:hra.studyregistration@nhs.net). The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

**It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).**

#### **Ethical review of research sites**

##### **NHS sites**

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

#### **Approved documents**

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Copies of advertisement materials for research participants [Recruitment Poster]	2	11 September 2017
GP/consultant information sheets or letters [Letter to Health Professional]	3	08 September 2017

Interview schedules or topic guides for participants [Interview Schedule/Demographics]	2	08 September 2017
IRAS Application Form [IRAS_Form_20102017]		20 October 2017
Non-validated questionnaire [AUDIT-C and DAST]		
Non-validated questionnaire [Adapted Traumatic Life Events Questionnaire]	3	22 September 2017
Participant consent form [Prison Officer Consent Form]	3	11 September 2017
Participant consent form [Prisoner Consent Form]	4	24 November 2017
Participant information sheet (PIS) [Prison Officer PIS]	3	08 September 2017
Participant information sheet (PIS) [Prisoner Information Sheet]	4	24 November 2017
Research protocol or project proposal [Joint Protocol]	4	15 September 2017
Summary CV for Chief Investigator (CI) [TM Summary CV]		
Summary CV for student [Eleanor Seddon CV]		11 September 2017
Summary CV for student [Eimear Crowe CV]		15 September 2017
Validated questionnaire [PCL-5]	3	14 August 2013
Validated questionnaire [Ohio State]		
Validated questionnaire [HADS]		
Validated questionnaire [Rivermead]		
Validated questionnaire [GODS]		
Validated questionnaire [Copyright Validated Measures]	1	22 September 2017

#### Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

#### After ethical review

##### Reporting requirements

The attached document "*After ethical review – guidance for researchers*" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

#### User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: <http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/>

## HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at <http://www.hra.nhs.uk/hra-training/>

17/WS/0230

Please quote this number on all correspondence

With the Committee's best wishes for the success of this project.

Yours sincerely



for  
Dr Stewart Campbell  
Chair

Enclosures: List of names and professions of members who were present at the meeting and those who submitted written comments

"After ethical review – guidance for researchers"

Copy to: Ms Emma-Jane Gault, University of Glasgow  
Ms Sophie Bagnall, NHS Greater Glasgow and Clyde

## West of Scotland REC 5

## Attendance at Sub-Committee of the REC meeting

## Committee Members:

Name	Profession	Present	Notes
Dr Stewart Campbell	Consultant Physician & Gastroenterologist (CHAIR)	Yes	
Professor Doreen McClurg	Reader	Yes	

## Also in attendance:

Name	Position (or reason for attending)
Mrs Sharon Macgregor	REC Manager

Appendix 2.3

SPS ethical approval

**From:** Carnie James [<mailto:James.Carnie@sps.pnn.gov.uk>]  
**Sent:** 12 October 2017 11:50  
**To:** Tom McMillan  
**Cc:** Porter John (HEALTHCARE IMPROVEMENT SCOTLAND - SD039) ([john.porter1@nhs.net](mailto:john.porter1@nhs.net)); Parker Ruth; Christie Emma  
**Subject:** RE: Head Injury and Offending

Tom

RAEC met yesterday and was content to approve access for the women in custody and brain injury proposal and also for the second proposal on the effectiveness of a brief education programme on brain injury for prisoners.

Can you please sign our standard access conditions and return (either electronically or hard copy).

Thanks  
Jim

Additional measures completed to support parallel research study

Name of Measure	Description	Reference
Rivermead Post-Concussion Questionnaire	This is a standardised tool to measure impact of head injury based on presence and severity of post-concussion symptoms. (King et al 1995).	King, N. S., Crawford, S., Wenden, F. J., Moss, N. E. G., & Wade, D. T. (1995). The Rivermead Post Concussion Symptoms Questionnaire: a measure of symptoms commonly experienced after head injury and its reliability. <i>Journal of neurology</i> , 242(9), 587-592.
Glasgow Outcome at Discharge Scale	This is a standardised structured interview of disability following head injury in relation to a number of domains including: activities of daily living, relationships and independence.	McMillan, T.M., Weir, C., Ireland, A., and Stewart, E. (2013) The Glasgow outcome at discharge scale: an inpatient assessment of disability after brain injury. <i>Journal of Neurotrauma</i> , 30 (11). pp. 970-974. ISSN 0897-7151
Dysexecutive Questionnaire- self report and informant report	This is a 20 item scale assessing perceptions of executive functioning difficulties taken from the Behavioural Assessment of the Dysexecutive Syndrome neuropsychological assessment battery.	Wilson, B. A., Alderman, N., Burgess, P. W., Emslie, H., & Evans, J. J. Behavioural assessment of the dysexecutive syndrome. 1996, Bury St. Edmund, UK: Thames Valley Test Company.
Symbol Digit Modalities Test	This is a measure of information processing abilities including attention, visual scanning, and motor speed.	Smith, A. (2013). Symbol digit modalities test: Manual.
Rey Auditory Learning Test	This is a test of verbal memory involving learning a list of words and examining ability to learn list with repetition over 5 trials.	Rey, A. (1964). Auditory verbal learning test. Psychological appraisal of children with cerebral deficits. Cambridge.

		Massachusetts: Harvard University Press.
Trail Making Test	This is a test of attention and task switching (key executive function skills).	Reitan, R. M. (1992). Trail Making Test: Manual for administration and scoring. Reitan Neuropsychology Laboratory.
Verbal Fluency Test	This is a measure of semantic memory. Participant has one minute to respond with as many words as they can to a particular category or letter.	Lezak, Muriel Deutsch (1995). Neuropsychological assessment. Oxford [Oxfordshire]: Oxford University Press.
Word Memory Test	This is a computerised test of effort.	Green, P., Allen, L. M., & Astner, K. (1996). The Word Memory Test: A user's guide to the oral and computer-administered forms, US Version 1.1. Durham, NC: CogniSyst.

Participant Recruitment Poster



## RECRUITING

## HEALTH & WELLBEING STUDY



We are trying to understand the needs of women in prison in Scotland. We want to know more about the health and well-being of women in prison in Scotland.

THIS RESEARCH STUDY IS OPEN TO ALL WOMEN IN THE PRISON.

DO YOU HAVE ABOUT 60 MINUTES TO SPARE TO TALK TO A RESEARCHER  
ABOUT YOUR HEALTH AND WELL-BEING?

IF YOU ARE INTERESTED, PLEASE TALK TO A STAFF MEMBER OR WRITE YOUR  
DETAILS BELOW AND LEAVE IN THE BALLOT BOX

---

NAME: \_\_\_\_\_

SPIN PRISON NUMBER: \_\_\_\_\_



## Participant Information Sheet



### **PARTICIPANT INFORMATION SHEET FOR WOMEN IN PRISON**

#### **Head Injury and its Impact on Women in Scottish Prisons**

We would like to invite you to help us in a research study.

#### **\*You can take part in this study even if you have not had a head injury\***

Before you decide whether or not to take part it is important for you to understand why the research is being done and what it will involve.

Please take time to read the following information carefully and discuss it with others if you wish.

If anything is unclear and you would like to ask us questions about the study please speak to a staff member who will notify us.

Take time to decide whether or not you wish to take part.

#### **What is the purpose of the study?**

We are carrying out this study to find out more about head injury in women in Scottish prisons.

We want to find out more about:

- how many women in Scottish prisons have had a head injury and how many women haven't had a head injury.
- the impact head injury has had on women in prison and any disability caused by the head injury.
- the causes and types of head injury in women in prison.
- whether or not people who had a head injury went to hospital for treatment
- the differences between people who have had a head injury and people who have not had a head injury (for example, we want to know if people who have had a head injury have more difficulties in their everyday lives).

We hope that this information could be used to help:

- understand more about the needs of women in prison who have had a head injury.
- provide information on whether services should be set up for women in prison who have had a head injury.

This study will contribute towards the researchers' qualifications by fulfilling a component of their Doctorate in Clinical Psychology degree.

**Why have I been chosen?**

You have been chosen because you are currently serving a custodial sentence in Scotland.

**Do I have to take part?**

It is up to you to decide whether or not to take part.

Should you decide to take part, there will be no consequences for you either way, except the time required to complete the study,

You will be given this information sheet to keep and if you would like to take part you will be asked to sign a consent form.

If you decide to take part, you can still withdraw from the study at any time and do not have to give a reason.

**What will happen to me if I take part?**

You will be invited to attend for a single assessment session lasting about 90 - 100 minutes (around an hour and a half).

If you need to you can take a break at any point during the session. You can also pull out of the study/stop the session at any stage if you want to.

The session will involve:

- a brief interview about your recent health and history of any head injuries you might have had
- brief questions on your previous forensic history such as the number and types of offences you have been charged for
- questionnaires about your mental health
- brief questions on how you might have got the head injury and any other difficult experiences you have had that might have had an impact on you
- tests of cognition, or 'thinking skills', such as concentration and memory

***You will not be asked to go into lots of detail in any question and can choose not to answer any question you feel uncomfortable with.***

If it is ok with you, we would also like to ask your named prison officer/prison key worker to answer a survey about any head injury-related symptoms or difficulties they think you might have.

Researchers will also ask for your permission to look at NHS records of any hospital admissions you have had involving a head injury.

**Where will the assessment take place?**

The assessment will take place in the prison. If you need to miss work to attend the study, you will not lose out on any work payments.

**What do I have to do?**

You will be asked to attend for an assessment that will take around 90 - 100 minutes.

**What are the possible disadvantages and risks of taking part?**

There are no particular disadvantages to taking part. **Participation will have no impact upon your custodial sentence.**

Some questions asking about your head injury and mental health might cause some distress for you. For example, we will ask some questions about how you might have got a head injury and whether or not you've experienced traumatic and distressing events that might have had an impact on you. We have made the questions as short as possible to reduce the chance of them causing you distress. You will not be asked to go into detail in these questions and can choose not to answer any question you are uncomfortable with. You can stop for a break or choose to pull out of the assessment at any time.

**What happens if I become upset or distressed as a result of taking part in this study?**

As mentioned above, in this study you will be asked some short questions on difficult experiences you might have had. If you find these questions upsetting while you are taking part in the study, please let the researchers know. If you get upset after the study has finished, please let a member of the NHS prison health service know so that they can provide you with support and help.

**What are the possible benefits of taking part?**

You will receive no direct benefit from taking part.

The information collected in the study will give us a better understanding of head injury in women in prisons, and may allow us to make recommendations for prison health service improvements.

**Will my taking part in this study be kept confidential?**

You will be identified by a number only and not by your name/prison number. Any information about you will have your name removed so that you cannot be recognised from it. Information collected will be kept in the University of Glasgow in a locked cabinet for 10 years in order to meet record keeping guidelines and for future research. Scientific reports or publications arising from the research will not identify you or anyone taking part.

If it is ok with you, researchers will obtain information from NHS records about any hospital admission you have had for a head injury. This information will be anonymised and kept confidential. We will not take obtain any other information from your NHS records.

All information collected about you during the research will be kept strictly confidential, accessible only to the researchers working on this study and the study sponsor, NHS Greater Glasgow & Clyde, who will make sure that the study is being conducted correctly.

We will let the NHS prison health service know that you are taking part in this study. However, all the information you tell us will be kept confidential and we will not tell the prison health service/prison staff about the things you tell us in the interview. If during the assessment we find that you are experiencing distress as a result of a traumatic experience we will ask your permission to let the prison health service know about this. We will also ask for permission to let the prison health service know if you have had a head injury that seems to be impacting on your life. **We will not pass this information on to the prison health service if you do not want us to.**

***However, the following exceptions to confidentiality apply.***

If during the course of the research we become concerned that you or another person is at risk of harm (for example, if you tell us you are thinking of suicide), we are obligated to pass this information on to the Scottish Prison Service and the prison health service. We also have to tell the Scottish Prison Service if you tell us about a crime that has been committed that has not yet been reported to the police.

If we find out that you have a very severe head injury and disability and you may be at risk as a result of this, we will inform the Prison Health Service of this so that it can inform your future care.

**What happens if I lose capacity?**

Capacity means your ability to understand and consent to taking part in this research. If you lose capacity before taking part in this study or while you are taking part in it, you will be withdrawn from the study and any data you have provided up to that point will be destroyed. However, if you lose capacity after you have taken part in the research (after you have completed the assessment) your data will remain in the study. As all the data you provide us during the study will be anonymised, it will not be possible to withdraw your data at a later stage after you have participated in the study.

**What will happen to the results of the research study?**

When the project is completed, the findings will be submitted for publication in academic journals. The results may be used in conference presentations, and will be included in theses to fulfill the requirements of the Doctorate in Clinical Psychology.

**Who is organising and funding the research?**

The research is organised by the University of Glasgow. The research is funded by the University of Glasgow and by the National Prison Healthcare Network.

**Who has reviewed the study?**

The project has been reviewed by the University of Glasgow College of Medical Veterinary and Life Sciences, the West of Scotland NHS Research Ethics Committee and the Scottish Prison Service.

**Complaints process**

You have the right to complain about your involvement in this study if you are not happy with it. If you have any complaints about any part of your involvement in this

research study, please tell the following member of staff in the NHS healthcare service within [name of prisoner's prison to be added here: HMP Greenock/HMP Edinburgh/HMP Cornton Vale/YOI Polmont/HMP Grampian]:

[Name, designation and contact details of a specific contact person within the prisoner's prison will be detailed here]

Any complaints you have about this research will be passed on to the NHS complaints process by [the above named contact point]. The NHS complaints process will then deal with your complaint.

**Contact for Further Information**

If you have any questions you can contact the researchers by telephone on 0141 211 0354. You can also let prison staff know that you wish to contact us, and they will let us know so we can contact you. The researchers working on this study are:

Dr. Eimear Crowe (Trainee Clinical Psychologist)

Ms. Eleanor Seddon (Trainee Clinical Psychologist)

Ms. Hira Aslam (Research Assistant)

Professor Tom McMillan (Clinical Neuropsychologist and Principal Investigator supervising this research).

**Thank you for considering this request to take part in the study.**

Participant Consent Form



Participant ID Number: \_\_\_\_\_

**CONSENT FORM FOR WOMEN IN PRISON**  
**Title: Head Injury and its Impact on Women in Scottish Prisons**

Please initial  
box

1. I confirm that I have read and understand the women in prison information sheet dated 24/11/17 (version 4) about this study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary, that it will have no effect on my custodial sentence and that I am free to withdraw at any time, without giving any reason and without my legal rights being affected. ☐
3. I give permission for the NHS Prison Health Service to be informed if I experience distress or become very upset during the course of the study. (Please circle 'yes' if you would like us to pass this information on. Please circle 'no' if you would not like us to pass this information on. Please note that there are exceptions where the researchers will have to pass certain information on, even if you circle no. These are outlined in numbers 4 and 5 below.) YES / NO
4. I agree that if researchers believe that I or another person is at risk of harm or that an unreported crime has been committed, they will pass this information to prison staff. This information will be passed on even if I circled 'no' above. ☐
5. I agree that if a severe head injury and disability is identified during the course of the study, researchers will inform the Prison Health Service of this so that it can inform my future care. This information will be passed on even if I circled 'no' for number 3 above. ☐
6. I agree that the researchers can obtain NHS records pertaining to any hospital admissions I have had. ☐
7. I understand that anonymous data collected during the study will be looked at by researchers from University of Glasgow and the study sponsor, NHS Greater Glasgow & Clyde (for audit purposes). I give permission for these individuals to have access to my records. ☐
8. I agree to my data being retained for 10 years, including following loss of capacity. I understand this is for the purpose of future research and that all data will be destroyed after this period. ☐
9. I agree to take part in the above study. ☐

\_\_\_\_\_  
*Name of participant*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Name of Person taking consent*

\_\_\_\_\_  
*Date*

\_\_\_\_\_  
*Signature*

Letter to healthcare professional



Professor Thomas McMillan  
University of Glasgow  
Institute of Health and Wellbeing  
First floor Admin building  
Gartnavel Royal Hospital  
1055 Great Western Road  
Glasgow  
G12 0XH

(HEALTH PROFESSIONAL  
INSERT RELEVANT  
PRISON ADDRESS)

Dear

Re: (INSERT PARTICIPANT'S NAME)

We are recruiting women in prison to take part in our study as we are aiming to understand the needs of women in prison with head injury.

I am writing to inform you that the above named woman has agreed to participate in our research study on head injury in female prisoners. An information sheet with details of the study is enclosed.

We are recruiting prisoners who **may or may not** have a head injury. Many of our participants will not have a head injury therefore we cannot infer this about the above named participant's care at this stage.

One of our researchers will meet with the above named participant over the upcoming months. If our study identifies that they have had a significant head injury with resulting disability, we will write to you following the study.

In the meantime, should you wish to contact us regarding the study, contact details are contained within the enclosed information sheet.

Yours Sincerely,

Professor Tom McMillan  
Eleanor Seddon  
Dr. Eimear Crowe

## Appendix 2.9

### Ohio State University TBI Identification Method (OSU-TBI-ID) (Corrigan & Bogner, 2007)

Name: \_\_\_\_\_ Current Age: \_\_\_\_\_ Interviewer Initials: \_\_\_\_\_ Date: \_\_\_\_\_

#### Ohio State University TBI Identification Method — Interview Form

##### Step 1

Ask questions 1-5 below. Record the cause of each reported injury and any details provided spontaneously in the chart at the bottom of this page. You do not need to ask further about loss of consciousness or other injury details during this step.

**I am going to ask you about injuries to your head or neck that you may have had anytime in your life.**

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck? Think about any childhood injuries you remember or were told about.

☐ No ☐ Yes—Record cause in chart

2. In your lifetime, have you ever injured your head or neck in a car accident or from crashing some other moving vehicle like a bicycle, motorcycle or ATV?

☐ No ☐ Yes—Record cause in chart

3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock)? Have you ever injured your head or neck playing sports or on the playground?

☐ No ☐ Yes—Record cause in chart

4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, or from being shaken violently? Have you ever been shot in the head?

☐ No ☐ Yes—Record cause in chart

5. In your lifetime, have you ever been nearby when an explosion or a blast occurred? If you served in the military, think about any combat- or training-related incidents.

☐ No ☐ Yes—Record cause in chart

**Interviewer instruction:**

If the answers to any of the above questions are "yes," go to Step 2. If the answers to all of the above questions are "no," then proceed to Step 3.

##### Step 2

Interviewer instruction: If the answer is "yes" to any of the questions in Step 1 ask the following additional questions about each reported injury and add details to the chart below.

Were you knocked out or did you lose consciousness (LOC)?

If yes, how long?

If no, were you dazed or did you have a gap in your memory from the injury?

How old were you?

##### Step 3

Interviewer instruction: Ask the following questions to help identify a history that may include multiple mild TBIs and complete the chart below.

Have you ever had a period of time in which you experienced multiple, repeated impacts to your head (e.g. history of abuse, contact sports, military duty)?

If yes, what was the typical or usual effect—were you knocked out (Loss of Consciousness - LOC)?

If no, were you dazed or did you have a gap in your memory from the injury?

What was the most severe effect from one of the times you had an impact to the head?

How old were you when these repeated injuries began? Ended?

Step 1	Step 2						
Cause	Loss of consciousness (LOC)/knocked out				Dazed/Mem Gap		Age
	No LOC	< 30 min	30 min-24 hrs	> 24 hrs	Yes	No	

If more injuries with LOC: How many? \_\_\_\_\_ Longest knocked out? \_\_\_\_\_ How many ≥ 30 mins.? \_\_\_\_\_ Youngest age? \_\_\_\_\_

Step 3	Typical Effect		Most Severe Effect				Age	
Cause of repeated injury	Dazed/ memory gap, no LOC	LOC	Dazed/ memory gap, no LOC	LOC < 30 min	LOC 30 min - 24 hrs.	LOC > 24 hrs.	Began	Ended



Name: \_\_\_\_\_ Current Age: \_\_\_\_\_ Interviewer Initials: \_\_\_\_\_ Date: \_\_\_\_\_

[illegible]

## Interpreting Findings

- **WORST**  
One moderate or severe TBI

- **FIRST**  
TBI with loss of consciousness before age 15

- **MULTIPLE**  
2 or more TBIs close together, including a period of time when they experienced multiple blows to the head

- **RECENT**  
A mild TBI in the last weeks or a more severe TBI in the last months

- **OTHER SOURCES**  
Any TBI combined with another way that their brain function has been impaired

[illegible]

**For more information about TBI  
or the OSU TBI Identification  
Method visit:**

- Ohio Valley Center at OSU  
[www.ohiovalley.org/informationeducation](http://www.ohiovalley.org/informationeducation)
- BrainLine.org  
[www.brainline.org](http://www.brainline.org)

## Appendix 2.10

## Adapted Traumatic Life Events Questionnaire (Kubany et al., 2000)

The purpose of this questionnaire is to identify important life experiences that can affect a person's emotional well-being or later quality of life. The events listed below are far more common than many people realize. Please read each question carefully and mark the answers that best describe your experience.

1. **Have you ever experienced a natural disaster (a flood, hurricane, earthquake, etc.)?**
  - Yes/No
  - *If this happened:* What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
2. **Were you involved in a motor vehicle accident for which you received medical attention or that badly injured or killed someone?**
  - Yes/No
  - *If this happened:* What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
3. **Have you been involved in any other kind of accident where you or someone else was badly hurt? (examples: a plane crash, a drowning or near drowning, an electrical or machinery accident, an explosion, home fire, chemical leak, overexposure to radiation or toxic chemicals)**
  - Yes/No
  - *If this happened:* What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
4. **Have you lived, worked, or had military service in a war zone? Yes / No**  
**If yes, were you ever exposed to warfare or combat? (for example: in the vicinity of a rocket attack or people being fired upon; seeing someone get wounded or killed)**
  - Yes/No
  - *If this happened:* What age were you? \_\_\_\_\_

- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**5. Have you experienced the sudden and unexpected death of a close friend or loved one?**

- Yes/No
- If this happened: What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**6. Has a loved one ever survived a life threatening or permanently disabling accident, assault, or illness?**

(examples: spinal cord injury, rape, cancer, serious heart condition, life threatening virus)

- Yes/No
- If this happened: What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**7. Have you ever had a life threatening illness?**

- Yes/No
- If this happened: What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head or brain? Yes / No

**8. Have you been robbed or been present during a robbery where the robber(s) used or displayed a weapon?**

- Yes/No
- If this happened: What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**9. Have you ever been hit or beaten up and badly hurt by a stranger or by someone you didn't know very well?**

- Yes/No

- *If this happened*: What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
10. Have you seen a stranger (or someone didn't know very well) attack or beat up someone and seriously injure or kill them?
- Yes/No
  - *If this happened*: What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
11. Has anyone threatened to kill you or cause you serious physical harm?
- Yes/No
  - *If this happened*: What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
12. While growing up: Were you physically punished in a way that resulted in bruises, burns, cuts, or broken bones?
- Yes/No
  - *If this happened*: What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
13. While growing up: Did you see or hear family violence? (such as your father hitting your mother; or any family member beating up or inflicting bruises, burns or cuts on another family member)
- Yes/No
  - *If this happened*: What age were you? \_\_\_\_\_
  - How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
  - Did you experience intense fear, helplessness, or horror when it happened? yes / no
  - Did this result in injury to your head? Yes / No
14. Have you ever been slapped, punched, kicked, beaten up, or otherwise physically hurt by your spouse (or former spouse), a boyfriend/girlfriend, or some other intimate partner?

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**15. Before your 16<sup>th</sup> birthday, did anyone touch sexual parts of your body, make you touch sexual parts of their body or make you have sex --against your will or without your consent?**

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**16. After your 16<sup>th</sup> birthday, did anyone touch sexual parts of your body, make you touch sexual parts of their body or make you have sex --against your will or without your consent?**

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**17. Were you ever subjected to uninvited or unwanted sexual attention? (*other than* sexual contact covered by 15 or 16,) (examples: cornering, pressure for sexual favours, verbal remarks)**

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**18. Has anyone stalked you--in other words: followed you or kept track of your activities--causing you to feel intimidated or concerned for your safety?**

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no

- Did this result in injury to your head? Yes / No

**19. Have you or a romantic partner ever had a miscarriage?**

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**20. Have you or a romantic partner ever had an abortion?**

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

**21. Have you experienced (or seen) any other events that were life threatening, caused serious injury, or were highly disturbing or distressing?** (examples: lost in the wilderness; a serious animal bite; violent death of a pet; being kidnapped or held hostage; seeing a mutilated body or body parts)

- Yes/No
- *If this happened:* What age were you? \_\_\_\_\_
- How often did this happen: (1) never (2) once (3) twice (4) 3 times (5) more than 3 times?
- Did you experience intense fear, helplessness, or horror when it happened? yes / no
- Did this result in injury to your head? Yes / No

## Appendix 2.11

## Data capture form

Data Capture Form				
Participant ID no				
Age				
Ethnicity	White			
	Mixed or multiple			
	Asian			
	Asian/Caribbean/Black			
	Other			
Postcode - Socio-economic status (DEPCAT or SIMD scores)				
Years of education				
Schooling type	Mainstream			
	Mainstream with 1:1 support			
	Specialist			
Did you miss any school? Approximately how often?		<20 times through school career	At least once/month (from - until)	At least once/Week (from - until)
	Truancy			
	Illness			
	Suspension/exclusion			
Most recent occupation category	Managers, directors and senior officials			
	Professional occupations			
	Associate Professional And Technical Occupations			
	Administrative And Secretarial Occupations			
	Skilled Trades Occupations Caring, Leisure And Other Service Occupations			
	Sales And Customer Service Occupations			
	Process, Plant And Machine Operatives			
	Elementary Occupations			

	None	
Previous problematic alcohol use (where it significantly affected your functioning - family / job / social)	Yes	No
IF YES: how long did you have a problem for (in years)?		
IF YES: When was this?		
Were you ever treated for alcohol problems?	Yes	No
IF YES: What kind of treatment?		
Previous problematic substance use (where it significantly affected your functioning - family / job / social)	Yes	No
IF YES: how long did you have a problem for (in years)?		
IF YES: When was this?		
Were you ever treated for drug problems?	Yes	No
IF YES: What kind of treatment?		
Have you taken any alcohol in the past 24 hours?	Yes	No
Have you taken any substances in the past 24 hours?	Yes	No
What medicines are you currently prescribed? (inc. methadone)		
IF PRESCRIBED METHADONE OR SLEEPING PILLS/BENZODIAZAPINE: What time did you take these last?		
Offence history	Number of arrests	
	Number of charges	
	Number of convictions	
	Length of custodial sentence served to date	
	Offence types	Violent
		Sexual
		Property
		Other
	Age at first offence	
HI's occurred before or after 1994	Before	
	After	
Estimated number of days spent in hospital?		
What was follow up after HI?	Verbal guidance	
	Written guidance	
	Appointment with health professional	



	On-going therapy/rehabilitation	
	Other	
OSU TBI-ID category of severity	No HI	
	Mild (no LOC)	
	Mild (LOC <30 minutes)	
	Moderate (includes multiple) - most severe injury LOC between 30 minutes and 24 hours	
	Severe includes multiple most severe injury LOC > 24 hours	
Glasgow Outcome at Discharge Scale (GODS) category	Dead (1)	
	Not conscious (2)	
	Lower Severe Disability (Lower SD) (3)	
	Upper Severe Disability (Upper SD) (4)	
	Lower Moderate Disability (Lower MD) (5)	
	Upper Moderate Disability (Upper MD) (6)	
	Lower Good Recovery (Lower GR) (7)	
	Upper Good Recovery (Upper GR) (8)	
Glasgow Outcome at Discharge Scale (GODS) category ( <i>proxy rating</i> )	Dead (1)	
	Not conscious (2)	
	Lower Severe Disability (Lower SD) (3)	
	Upper Severe Disability (Upper SD) (4)	
	Lower Moderate Disability (Lower MD) (5)	
	Upper Moderate Disability (Upper MD) (6)	
	Lower Good Recovery (Lower GR) (7)	

	Upper Good Recovery (Upper GR) (8)	
Hospital Anxiety and Depression Scale (HADS) score	Depression score	
	Anxiety score	
Adult Memory and Information Processing Battery (AMIPB) - List Learning Sub-Test score		
Symbol Digit Modalities Test (SDMT) score		
Trail Making Test (TMT) score	Part 1 score (seconds)	
	Part 2 score (seconds)	
Hayling Sentence Completion Test score (seconds)		
Word Memory Test score		
Rivermead Score		
AUDIT		
DAST		
TLEQ Score		
PCL-5 Score		
COWAT Score	Categories-	Letters-
DEX	Self	Informant
Number of incident Reports		
<p><b>Previous psychiatric or physical health conditions</b></p> <p>Have you currently or previously been diagnosed with any of chronic physical or mental health conditions? (YES/NO) e.g. heart attack, stroke, depression, schizophrenia. (Include if the individual has experienced anxiety or depression but has not received a formal diagnosis)</p> <p><b>If so, please state.</b></p>		

## Chapter two: Major Research Project

## Appendix 2.12

Physical and mental health of sample (according to ICD-10 classifications), HADS and PCL-5

	ICD Disease Classification	n (%)
<b>Physical health</b>	D50-D89 Blood	1 (1.61%)
	E00-E89 Endocrine/ nutritional /metabolic	4 (6.45%)
	G00-G99 Nervous system	15 (24.19%)
	I00-I99 Circulatory system	12 (19.35%)
	J00-J99 Respiratory system	10 (16.13%)
	K00-K95 Digestive system	8 (12.9%)
	L00-L99 Skin /subcutaneous tissue	4 (6.45%)
	M00-M99 Musculoskeletal system / connective tissue	20 (32.25%)
	N00-N99 Genitourinary system	3 (4.83%)
	S00-T88 Injury/poisoning /other external	1 (1.61%)
	Z00-Z99 Factors influencing health status and contact with health services	4 (6.45%)
<b>Mental, Behavioural and Neurodevelopmental disorders</b>	F01-F09 Mental disorders due to known physiological conditions (e.g. Dementia)	1 (1.61%)
	F10-F19 Mental and behavioural disorders due to psychoactive substance use	1 (1.61%)
	F20-F29 Schizophrenia, schizotypal, delusional, and other non-mood psychotic disorders	4 (6.45%)
	F30-F39 Mood [affective] disorders	50 (80.65%)
	F40-F48 Anxiety disorders	43 (69.35%)
	F60-F69 Disorders of adult personality and behaviour	15 (24.19%)
	F90-F98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence	1 (1.61%)
<b>Hospital Anxiety &amp; Depression (HADS) Scores above cut off N (%)</b>		42 (77%)
	Anxiety	
	Depression	22 (36.7%)
<b>PCL-5 Scores</b>	N (%) above cut-off	45 (75%)

## Appendix 2.13

## Research Proposal



---

**Institute of Health  
& Wellbeing****DOCTORATE IN CLINICAL PSYCHOLOGY****SUBMISSION COVER PAGE****Matriculation Number: 2230374****Name of Assessment: MRP Proposal****Title of Project: The epidemiology of head injury in women prisoners****Date of Submission: 25<sup>th</sup> July 2017****Version Number: 3****Word Count, including reference list (excluding appendices): 3454**  
(maximum word count is 3000)**Word Count for Abstract (included in overall word count): 191** (maximum  
word count is 200)**Word Count for Plain English Summary (Not included in overall word count):**  
497 (max 500 words)**Title: The epidemiology of head injury in women prisoners**

## Appendix 2.13: Research Proposal

### **Abstract**

#### **Background**

Prisoners in Scotland are four and a half times more likely to have been admitted to hospital with a head injury (HI) than the general population (NHPN, 2016, p. 10). Women in Scottish prisons (WiP) were six times more likely to have had a HI than the general population, and had a higher relative risk of HI than men in prison. The NHPN (2016) report recommended investigation into the epidemiology of HI in WiP to uncover if WiP have any unmet needs in prison, why there is a gender difference and what role HI has played in offending behaviour.

#### **Aims**

To investigate the epidemiology of HI in WiP and how this differs to previous research on HI in the general population and male prisoners.

#### **Methods**

We aim to recruit 100-200 participants, representing half the population of WiP in Scotland, to complete measures of epidemiological factors of HI including: severity and cause of HI, offending behaviour, and mental health.

#### **Applications**

WiP with HI are an under-researched population and more information is needed to uncover if they have unmet needs for rehabilitation that could inform services for preventing and rehabilitating HI in WiP

## Appendix 2.13: Research Proposal

### Introduction

Prisoners in Scotland are four and a half times more likely to be admitted to hospital with a head injury (HI) than the general population (NHPN, 2016, p. 10). Surprisingly, women in prison (WiP) are six times more likely to be admitted to hospital with a HI than the general population, and have a higher relative risk of HI than men (p.11), whereas in the general population men are twice as likely to have had a HI than women (Shivaji et al., 2014). It is unclear why there is a higher relative risk of hospitalised HI in WiP and more information about the epidemiology, including; types, causes and severity of HI would be helpful to understand its role in offending and to inform possible preventative measures for a population that may be vulnerable to HI and offending.

Typical cognitive impairments after HI including emotional dysregulation, impulsivity, aggression and problem solving difficulties could predispose offending (Shiroma et al., 2010; NHPN, 2016). Individuals with HI are more likely to be convicted of a violent crime (Fazel et al., 2011); have more disciplinary incidents in prison (Merbitz et al., 1995); and have less positive outcomes from rehabilitation whilst in prison (Shiroma et al., 2010). Colantonio et al (2014) found that 54% of WiP had a HI prior to their first offence, compared to 32% of men, suggesting that HI may play a larger role in offending for WiP than men (O'Sullivan et al., 2015).

Women are at higher risk of HI caused by gender-based violence, which may contribute to the gender difference in risk of HI in prisoners (Kwako et al., 2011; Tagliaferri et al., 2006). In a study of HI in a trauma population, Doherty et al (2016) found that 27% had acquired their HI through gender-based violence. Violence was the most common cause of HI in a

### Appendix 2.13: Research Proposal

study of French WiP, which contrasts with the general population, where the majority of HIs are caused by falls and road traffic accidents (Durand, et al., 2017). The severity of HI could differ in women with HI caused by gender-based violence or childhood abuse. They may be more likely to sustain multiple mild head injuries from repeated physical violence rather than a single severe trauma to the head such as that of a fall or motor vehicle collision (Kwako et al., 2011). Prevalence of HI when measured by self-report might be higher than reflected by hospital records because women who experience gender-based violence may not attend hospital (NHPN 2016). Examining the difference between self-report and hospital records may shed light on an under-reported HI population.

This study will investigate the epidemiology of HI in WiP as part of a larger study on WiP (alongside a second doctorate in clinical psychology trainee) that will investigate neuropsychological impairment, disability and impact of HI on WiP. Recognising HI in WiP is important to guide formulation of offending behaviour and help address risk (Wortzel & Arciniegas, 2013). These studies aim to inform services of any unmet needs in this under-researched population, which benefits both the individual and society in terms of increasing wellbeing and reducing reoffending. Additionally, on a public health level, it could provide services with more information on risk factors for HI in a vulnerable population, which could inform preventative measures and support formulation of offending behaviour in WiP with HI. This would aid services to target rehabilitative interventions aimed at reducing risk of reoffending.

## Appendix 2.13: Research Proposal

### Aims and Hypotheses

#### Aims:

To investigate the epidemiology of HI in Scottish WiP, including; cause, type and severity of HI; and co-morbid physical and mental health conditions.

To understand more about the role of HI in offending behaviour(violent/non violent) in WiP.

To explore why WiP have a higher relative risk of HI than men in prison.

To uncover the prevalence of gender-based violence in WiP with HI and whether it has a causal role in HI.

To explore the difference in the prevalence of HI between self-report and hospital records.

#### Hypotheses

This is an epidemiological study; therefore the main aims are to gain further information about the population of WiP with HI. Preliminary hypotheses include:

1. Self-report of WiP will show higher prevalence of HI than hospital records.
2. HI in WiP will be more likely to have occurred prior to initial offending behaviour.
3. WIP who acquired their HI through violence will be less likely to attend hospital than those who acquired their HI due to falls or road traffic accidents.



## Appendix 2.13: Research Proposal

### Plan of Investigation

#### Participants

There are approximately 400 WiP in Scotland (Scottish Centre for Crime and Justice Research, 2015). This study aims to recruit 100-200 participants, representing half the population of WiP. Participants will be recruited from Cornton Vale, Polmont Young Offenders Institute, HMP Edinburgh, HMP Greenock and HMP Grampian.

#### Inclusion and Exclusion Criteria

##### *Inclusion Criteria:*

WiP over the age of 16 years.

##### *Exclusion criteria:*

Participants will be excluded from the study if they:

- Cannot provide informed consent,
- Have an acute and severe mental health disorder
- Are deemed by prison staff to pose significant risk of violence to researchers.
- Have insufficient understanding of the English language to be able to participate in the study.

#### Recruitment Procedures

This study aims to recruit participants with support of the NHPN, the National Health Service and Scottish Prison Service (SPS) staff through word of mouth and posters advertising the study in common areas. This method has been successful in studies on men in Scottish prisons (McGinlay & Walker, 2017, personal communication). A second trainee will recruit and assess participants as part of a separate but related project (see

## Appendix 2.13: Research Proposal

Appendix E). Funding has been applied for to the Scottish Government for a research worker to support recruitment and assessment of participants. It is anticipated that this resource of up to three researchers will be sufficient to recruit the sample.

### **Design**

In part the design is descriptive in relation to epidemiological and injury factors of WiP with HI. These are:

- Severity, cause and number of HIs
- Prevalence of HI when comparing hospital records versus self report
- presence of psychological trauma (gender-based violence and childhood abuse)
- comorbidities including substance use, physical and mental health problems
- age at first head injury
- age at first offence
- type of offending (violent/non violent)
- demographic information

### **Measures**

Participants will be given a range of epidemiological measures summarised in Table 1.

## Appendix 2.13: Research Proposal

<b>Table 1: Summary of measures to be used</b>			
<b>Epidemiological factor</b>	<b>Measure</b>	<b>Description</b>	<b>Approximate Time to administer</b>
Severity, cause and number of HI	The Ohio State University Traumatic Brain Injury Identification Method (OSU HI-ID, Corrigan & Bogner, 2007)	A standardised questionnaire of ten questions that identifies the cause and severity of Head Injury. It has good inter-rater reliability and validity and is validated for use in prisons in the US. (Corrigan & Bogner, 2007, )	10 minutes
Hospitalised head injury	Electronic health records (SMR-01)	ICD codes 9 and 10	n/a
Current Emotional Distress	Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983)	A 14 item self-report of anxiety and depression symptoms. It is a reliable measure of emotional distress in a HI population (Whelan-Goodinson et al., 2009).	5 minutes
History of Psychiatric Disorder and Physical health problems	Self report and prison records	Participants will be asked to complete a short questionnaire with yes/no answers asking if they have ever been diagnosed with a psychiatric disorder or longstanding physical health problem Diagnoses of physical and mental health problems will be accessed via health records.	5 minutes
History of trauma (childhood abuse and gender based violence)	Traumatic Life Events Questionnaire (TLEQ) (Kubany et al 2000)	The TLEQ is a 24 item scale that assesses exposure to 16 potentially traumatic events ranging from natural disasters, childhood and adult abuse and other traumatic events. It also screens for symptoms of post traumatic stress disorder in relation to the traumatic events. (Kubany, et al., 2000)	10 minutes

## Appendix 2.13: Research Proposal

		The researchers have adapted the measure by reducing number of overall questions in an effort to reduce the risk of re-living and re-traumatisation causing distress.	
History of substance use	Screening questions and adapted version of the AUDIT-C and Drug Use Questionnaire (DAST-10)	<p>The AUDIT-C is a shortened 3 item version of the Alcohol Use Disorders Identification Test. (Reinert &amp; Allen, 2007). It has high sensitivity and specificity for alcohol use problems. (Bradley et al. 2007)</p> <p>The DAST (1982) is a 10 item screening questionnaire looking at drug use over the past twelve months.</p>	8 minutes
Demographics	Demographic questionnaire	Age, ethnic origin, disability, level of education, postcode prior to incarceration (to calculate socioeconomic status), employment status prior to prison	5 minutes
Offence Information	Offence Questionnaire	Questions regarding number of convictions, type of offence (violent/non violent) and estimated total time in prison.	3 minutes

The writer will also complete measures in Appendix B2 with participants to support the second doctoral study.

### Research Procedures

Following recruitment, participants will be invited to attend an interview session expected to last no longer than one hour to complete measures described above and in Appendix B2. Permission will be sought to access participants' history of hospitalised HI

### Appendix 2.13: Research Proposal

from Scottish Morbidity Records-01 (SMR-01). Self-reported HI will be cross-referenced with SMR-01. In order to access SMR-01 an application will be submitted to the Independent Services Division (ISD) to access health records information using participants' chi numbers and requesting information regarding International Classification of Diseases (ICD) 9 and 10; the year of, duration of and age at admission.

#### **Data Analysis**

Data will be analysed using descriptive and inferential statistics. Where appropriate, regression will be used to assess whether specific epidemiological factors predict risk of HI and vice versa. Between groups comparisons will be made where appropriate, comparing epidemiological differences between individuals with and without HI, and to assess if there are differences in epidemiological factors dependent on HI severity.

#### **Justification of sample size**

This study aims to gain a representative picture of the epidemiology, severity and comorbidity of HI in women prisoners. A recent meta-analysis estimated prevalence of HI in WiP to be 69.98% (CI 50.18-89.79) (Shiroma et al 2010). This would estimate that 280 (CI 201-359) Scottish WiP have a HI. If looking at HI with loss of consciousness (LOC) the estimated prevalence is 55.28% (CI 41.26-69.29), suggesting that 221 (CI 165- 277) WiP in Scotland have a HI with LOC. If recruiting 100-200 people we would therefore expect approximately 55-110 of them to have a HI with LOC. One benefit of this study is that it would provide further normative data for WiP with HI for epidemiological measures described above to calculate sample size and power for future studies. Given the paucity of literature in this area this would be a key benefit. Of note is that a recent study with

## Appendix 2.13: Research Proposal

similar design on males recruited almost exclusively those with a history of HI; the study seemed to attract those with a HI history although it was open to all (McGinlay & Walker, personal communication). It may be that a higher proportion of women recruited to the study will have a history of HI. To reduce this risk we have adjusted the recruitment poster to make participants aware that they do not need to have a HI to participate. Following data collection we will consider how representative our overall sample is of the WiP population by comparing our sample to epidemiological data from the 2016 prison census (McMillan et al in preparation) using odds ratios and 95% confidence intervals.

### **Settings and Equipment**

This research will be carried out in NHS clinic areas of prisons described above. Prison personnel will be present at all times. Researchers will attend SPS safety courses and induction, and follow prison policy and procedures for risk management at all times. Equipment required will be psychometric questionnaires and neuropsychological assessments.

## **Health and Safety Issues**

### **Researcher Safety Issues**

Given the nature of the prison population, researchers will follow policy and procedure at all times to ensure safety. The researcher will attend SPS mandatory training.

### **Participant Safety Issues**

No harm is anticipated to come from participation in the study, however some measures may bring up difficult memories or feelings of distress. To reduce risk of reliving trauma

### Appendix 2.13: Research Proposal

and distress related to this, measures do not ask precise details of the trauma and are yes/no binary responses. The TLEQ trauma measure has been adapted to reduce number of overall questions so that the participant does not have repetitive questions about trauma. Researchers will manage any distress using clinical skills gained throughout training and where appropriate will seek support from supervisor, prison or NHS clinical staff. Participants can take breaks or withdraw from the study at any time, and will be directed to appropriate supports on participant information sheets.

#### **Ethical Issues**

Permission will be sought from NHS and SPS ethics boards. Information and consent forms will be given to participants outlining the aims of the study and that they can withdraw at any time (BPS, 2010). Confidentiality will be maintained by storing participant personal information securely in a locked filing cabinet or a password protected/encrypted file on an NHS computer (Data Protection Act, 1998). Personal data will be removed from research data and stored in a password protected excel spreadsheet. Data will be stored securely for ten years following completion of the study in line with University guidelines (University of Glasgow, 2016).

WiP may be more likely to consent to research or reluctant to withdraw due to fear that this could impact on progress towards release (Institute of Medicine, 2006).

Participants will be reminded using the participant information sheet, and during the testing session, that participation is voluntary, they are free to stop or take a break at any time, and that this will not be fed back to their prison records. Given the possible cognitive impairment in this population, written information will be given in easy read format and will be discussed verbally.

### Appendix 2.13: Research Proposal

Participants' ability to give informed consent will be assessed by prison staff advice, and their ability to understand the participant information sheet and complete the consent form. Those unable to consent will not be included in the study.

#### **Financial Issues**

The majority of measures chosen are free to access and available online or within the University of Glasgow Mental Health and Wellbeing department. Funding will be required for printing, travel to prisons for data collection and for purchase of neuropsychological test forms.

#### **Provisional Timetable**

- MRP Proposal submitted to university for review- June 2017
- Final approved proposal and paperwork- June 2017
- Ethical approval to be sought- June-August 2017
- Recruitment and data collection- September 2017- April 2018
- May - July 2018 - Write up and analysis
- Major Research Project and systematic review submission end of July 2018

#### **Practical Applications**

This study explores the service needs of an under researched population. This will have an impact on potential interventions to improve quality of life and reduce risk of reoffending, which will benefit both the individual and society.



## Appendix 2.13: Research Proposal

## References

- Bernstein, D. P., Fink, L., Handelsman, L., Foote, J., Lovejoy, M., Wenzel, K., et al. (1994). Initial reliability and validity of a new retrospective measure of child abuse and neglect. *American Journal of Psychiatry*, 151 (8), 1132-6.
- BPS. (2010). Code of Human Research Ethics.
- Bradley, K. A., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Frank, D., & Kivlahan, D. R. (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. *Alcohol Clin Exp Res*, 31 (7), 1208-17.
- Coggon, D., Rose, G., & Barker, D. J. (2003). *Epidemiology for the uninitiated* (4th Edition ed.). BMJ.
- Colantonio, A., Kim, H., Allen, S., Asbridge, M., Petgrave, J., & Brochu, S. (2014). Traumatic Brain Injury and Early Life Experiences Among Men and Women in a Prison Population. *Journal of Correctional Health Care*, 20 (4), 271-279.
- Corrigan, J. D., & Bogner, J. (2007). Initial reliability and validity of the Ohio State University TBI identification method. *The Journal of Head Trauma Rehabilitation*, 22 (6), 318-329.
- Doherty, S., Craig, R., Gardani, M., & McMillan, T. (2016). Head injury in asylum seekers and refugees referred with psychological trauma. *Global Mental Health*, 3.
- Durand, E., Watier, L., Lécu, A., Fix, M., W, J. J., Chevignard, M., et al. (2017). Traumatic brain injury among female offenders in a prison population: results of the FleuryTBI study. *Brain and Behaviour*, 7 (e00535), 1-10.
- Fazel, S., Lichetnstein, P., Grann, M., & Långström, N. (2011). Risk of Violent Crime in Individuals with Epilepsy and Traumatic Brain Injury: A 35-Year Swedish Population Study. *PLOS Medicine*, 8 (12).
- Great Britain. (1998). *Data Protection Act*. London: Stationery Office.
- Institute of Medicine (US). (2006). *Committee on Ethical Considerations for Revisions to DHHS Regulations for Protection of Prisoners Involved in Research :Ethical Considerations for Research Involving Prisoners*. (L. O. Gostin, C. Vanchieri, & A. Pope, Eds.) Washington D.C: The National Academies Press.
- Kubany, E. S., Haynes, S. N., Leisen, M. B., Owens, J. A., Kaplan, A. S., Watson, S. B., et al. (2000). Development and preliminary validation of a brief broad spectrum measure of trauma exposure: The Traumatic Life Events Questionnaire. *Psychological Assessment*, 12, 210-224.

## Appendix 2.13: Research Proposal

- Kwako, L. E., Glass, N., Campbell, J., Melvin, K. C., Barr, T., & Gill, J. M. (2011). Traumatic Brain Injury in Intimate Partner Violence: A Critical Review of Outcomes and Mechanisms. *Trauma, Violence & Abuse*, 12 (3), 115-126.
- Merbitz, C., Jain, S., Good, G. L., & Jain, A. (1995). A reported head injury and disciplinary rule infractions in prison. *Journal of Offender Rehabilitation*, 22, 11-19.
- National Prisoner Healthcare Network. (2016). *Brain Injury and Offending*. NHS Scotland/Scottish Prison Service.
- O'Sullivan, M., Glorney, E., Sterr, A., Oddy, M., & da Silva Ramos, S. (2015). Traumatic brain injury and violent behaviour in females: A systematic review. *Aggression and Violent Behaviour* (25), 54-64.
- Reinert, D. F., & Allen, J. P. (2007). The alcohol use disorders identification test: an update of research findings. *Alcohol Clin Exp Res*, 31 (2), 185-99.
- Scottish Centre for Crime and Justice Research. (2015). *Who's in prison? A snapshot of Scotland's prison population*. Retrieved March 20, 2017 from <http://www.sccjr.ac.uk/wp-content/uploads/2015/10/SCCJR-Whos-in-prison.pdf>
- Scottish Government. (2016). *Introducing The Scottish Index of Multiple Deprivation 2016*. Retrieved May 15, 2017 from [www.gov.scot: http://www.gov.scot/Resource/0050/00504809.pdf](http://www.gov.scot/Resource/0050/00504809.pdf)
- Shiroma, E. J., Ferguson, P. L., & Pickelsimer, E. E. (2010). Prevalence of Traumatic Brain Injury in an Offender Population: A Meta-analysis. *Journal of Correctional Health Care*, 16 (2), 147-159.
- Shivaji, T., Lee, A., Dougall, N., McMillan, T., & Stark, C. (2014). The epidemiology of hospital treated traumatic brain injury in Scotland. *BMC Neurology*, 14 (2), 1-7.
- Skinner, H. A. (1982). The drug abuse screening test. *Addictive Behaviour*, 7 (4), 363-371.
- Tagliaferri, F., Compagnone, C., Korsic, M., Servadei, F., & Kraus, J. (2006). A systematic review of brain injury epidemiology in Europe. *Acta Neurochirurgica*, 148, 255-268.
- University of Glasgow. (2016, January 15). *Code of Good Practice in Research*. Retrieved November 28, 2016 from [http://www.gla.ac.uk/media/media\\_227599\\_en.pdf](http://www.gla.ac.uk/media/media_227599_en.pdf)
- Whelan-Goodinson, R., Ponsford, J., & Schönberger, M. (2009). Validity of the Hospital Anxiety and Depression Scale to assess depression and anxiety following traumatic brain injury as compared with the Structured Clinical Interview for DSM-IV. *Journal of Affective Disorders*, 114 (1), 94 - 102.

## Appendix 2.13: Research Proposal

- Wortzel, H. S., & Arciniegas, D. B. (2013). A Forensic Neuropsychiatric Approach to Traumatic Brain Injury, Aggression, and Suicide. *The Journal of the American Academy of Psychiatry and the Law* , 41 (2), 274-286.
- Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica* , 67 (6), 361-370.

**Research Proposal Appendices**

- Appendix A2- Plain English Summary
- Appendix B2- Additional Measures to support second study
- Appendix C2- Research Equipment Form
- Appendix D2- Health and Safety Form

## Appendix 2.13: Research Proposal

## Appendix A2

## Plain English Summary

**Title** – The epidemiology of head injury in women prisoners

**Background**

Women in prison (WiP) in Scotland are six times more likely to have a head injury (HI) than the general population, and have a higher risk of HI than men in prison (National Prisoner Healthcare Network, 2016). The impact of HI on decision making, emotion regulation and behavioural control could make someone more likely to offend and less likely to gain benefit from rehabilitation programmes (Shiroma et al., 2010). Epidemiology is defined as “how often diseases occur [in a population], and why” (Coggon et al., 2003, p.1). This study would give further information on cause and severity of HI in WiP and what factors may increase risk of HI. This study would help inform services of potential strategies to prevent HI in WiP and support the current population in terms of unmet needs and reducing reoffending

**Aims**

To explore the epidemiology of HI in WiP.

**Research Questions:**

## Appendix 2.13: Research Proposal

Is there a difference in prevalence rates of HI in WiP between self-report and hospital records?

What are the causes and severity of HI in WiP?

What are the other presenting problems of WiP with HI?

Is HI linked to specific types of offences?

### **Methods**

#### **Participants**

We aim to recruit up to 200 WiP who are over 16 years old.

#### **Recruitment**

Participants will be recruited from five Scottish prisons (Cornton Vale, Greenock, Grampian, Polmont and Edinburgh) using posters in communal areas and word of mouth from prison and NHS staff.

#### **Consent**

Participants will be given information and consent forms outlining the aims of the study and that they can withdraw at any time. Participants' ability to give informed consent will be assessed by prison staff advice, their ability to understand the information sheet and complete the

## Appendix 2.13: Research Proposal

consent form. Those unable to provide informed consent will not be included in the study.

### **Design of study**

Participants will be interviewed using questionnaires examining: severity, cause and number of HIs; age at first HI; age at first offence; type of offence; additional physical/mental health problems; and demographic information.

Medical records will also be accessed to get information on hospital attendance with HI and other diagnoses.

### **Key ethical issues**

Prisoners may be more likely to consent to research or reluctant to withdraw due to fear that this could impact on their release date. Participants will be reminded using the information sheet, and during the session, that participation is voluntary and will not impact prison records.

### **Practical Applications and Dissemination**

WiP with HI are an under-researched population and more information is needed to uncover any unmet needs. Results of the study will be shared with the National Prisoner Health Care Network and published in a scientific journal.

### References

Coggon et al (2003). *Epidemiology for the uninitiated* (4th Edition ed.). BMJ.

NHPN (2016). *Brain Injury and Offending* . NHS Scotland/Scottish Prison Service.

Shiroma et al (2010). Prevalence of Traumatic Brain Injury in an Offender Population: A Meta-analysis . *Journal of Correctional Health Care* , 16 (2), 147-159.



## Appendix B2

Additional measures to be completed to support wider research study

**Rivermead Post-Concussion Questionnaire (King, Crawford, Wenden, Moss, & Wade, 1995)**

This is a standardised tool to measure impact of head injury based on presence and severity of post-concussion symptoms. (King et al 1995). It takes approximately 5 minutes to complete.

**Glasgow Outcome at Discharge Scale (McMillan et al)**

This is a standardised structured interview of disability following head injury in relation to a number of domains including: activities of daily living, relationships and independence.

**Dysexecutive Questionnaire- self report (DEX; Wilson et al., 1996)**

This is a 20 item scale assessing perceptions of executive functioning difficulties taken from the Behavioural Assessment of the Dysexecutive Syndrome neuropsychological assessment battery. It should take approximately 5 minutes to complete.

**Symbol Digit Modalities Test (Smith, 2013)**

This is a measure of information processing abilities including attention, visual scanning, and motor speed. It should take approximately 5 minutes to administer.

**Rey Auditory Learning Test (Rey, 1964)**

This is a test of verbal memory and should take approximately 10 minutes to administer

**Trail Making Test (Reitan, 1992)**

This is a test of attention and task switching (key executive function skills). It should take approximately 2-3 minutes to complete.

**Verbal Fluency Test (Lezak, 1995)**

This is a measure of semantic memory which should take approximately 3-5 minutes to complete.

**Word Memory Test**

This is a computerised test of effort that should take no more than 7 minutes to complete. (Green, Allen & Astner, 1996)

## Appendix 2.13: Research Proposal

## References

- Green, P., Allen, L. M., & Astner, K. (1996). *The Word Memory Test: A user's guide to the oral and computer-administered forms*, US Version 1.1. Durham, NC: CogniSyst.
- King, N. S., Crawford, S., Wenden, F. J., Moss, N. E. G., & Wade, D. T. (1995). The Rivermead Post Concussion Symptoms Questionnaire: a measure of symptoms commonly experienced after head injury and its reliability. *Journal of neurology*, 242(9), 587-592.
- Lezak, Muriel Deutsch (1995). *Neuropsychological assessment*. Oxford [Oxfordshire]: Oxford University Press.
- McMillan, T.M., Weir, C., Ireland, A., and Stewart, E. (2013) The Glasgow outcome at discharge scale: an inpatient assessment of disability after brain injury. *Journal of Neurotrauma*, 30 (11). pp. 970-974. ISSN 0897-7151
- Reitan, R. M. (1992). *Trail Making Test: Manual for administration and scoring*. Reitan Neuropsychology Laboratory.
- Rey, A. (1964). *Auditory verbal learning test. Psychological appraisal of children with cerebral deficits*. Cambridge. Massachusetts: Harvard University Press.
- Sheridan, L.K., Fitzgerald, H.E., Adams, K.M., Nigg, J.T., Martel, M.M., Puttler, L.I., Wong, M.M., Zucker, R.A. Normative Symbol Digit Modalities Test performance in a community-based sample, *Archives of Clinical Neuropsychology*, Volume 21, Issue 1, January 2006, Pages 23-28, ISSN 0887-6177, <https://doi.org/10.1016/j.acn.2005.07.003>.
- Smith, A. (2013). *Symbol digit modalities test: Manual*.
- Wilson, B. A., Alderman, N., Burgess, P. W., Emslie, H., & Evans, J. J. Behavioural assessment of the dysexecutive syndrome. 1996, Bury St. Edmund, UK: *Thames Valley Test Company*.

## Appendix 2.13: Research Proposal

Appendix C2  
RESEARCH EQUIPMENT, CONSUMABLES AND EXPENSES

**Trainees:** 2 x trainees (names removed for anonymisation purposes)

**Year of Course** 2<sup>nd</sup> Year

**Intake Year** 2015

Please refer to latest stationary costs list (available from student support team)

Item	Details and Amount Required	Cost or Specify if to Request to Borrow from Department
Stationary	Pens and pencils: £2.00 Envelopes for responses: £9.01	Subtotal: £11.01
Postage	N/A	Subtotal:
Photocopying and Laser Printing	Information sheets: 200 Consent forms: 200 Posters: 20	420 * £0.05 Subtotal: £21.00
Equipment and Software	N/A	Subtotal:
Measures	<p>200 copies of each of the questionnaires below:</p> <p>The Ohio State University Traumatic Brain Injury Identification Method (OSU HI-ID, Corrigan &amp; Bogner, 2007) free to access. Will photocopy</p> <p>Rivermead Post-Concussion Questionnaire: Available in department</p> <p>Glasgow Outcome at Discharge Scale: Available in department</p> <p>Dysexecutive Questionnaire: Available in department</p> <p>Symbol Digit Modalities Test:</p> <p>Hayling Sentence Completion Test (Scoring forms only)</p> <p>Rey Auditory Learning Test: Available in department</p>	<p>£10</p> <p>£10</p> <p>Each test is 4 pages £40</p> <p>£10</p> <p>£500</p> <p>£140</p> <p>Each test is 6 pages- 30p per test photocopy costs. Total costs = £60</p>

## Appendix 2.13: Research Proposal

	Trail Making Test (Reitan, 1992): Non-copyrighted version to be photocopied	£10
	Benton's Verbal Fluency Test (Lezak, 1995): Non-copyrighted version to be photocopied	£10
	The Hospital Anxiety and Depression Scale: Non-copyrighted version to be photocopied	£20
	AUDIT and DAST-10: non-copyrighted versions to be photocopied	Free to access- photocopy costs - £10
	Traumatic Life Events Questionnaire and DEQ (available free of charge from author – 4 pages)	800 pages * 0.05 = £40
	Word Memory Test (paper copies to be ordered from USA)	£1075.92 (**approximate depending on exchange rate)
	Demographic questionnaire/ data capture form. Photocopies	4 pages each. £40
Miscellaneous	Travel costs to prisons (based on petrol at 117 p/l.)	Based on estimates of prisoners in each prison and time taken to recruit
	A round trip from: Gartnavel - Cornton vale is £9.94 From Gartnavel - HMP Greenock is £6.73 Gartnavel - YOI Polmont is £ 9.93 Gartnavel - HMP Edinburgh is £13.63 Gartnavel - HMP Grampian is £54.26	Cornton vale: 8 round trips x 9.94 = 79.52 Greenock: 8 x 6.73 = 53.84 Polmont: 5 x 9.93 = 49.65 Edinburgh: 3 x 13.63 = 40.89 Grampian: 1 x 54.26 = 54.26 Subtotal = £278**
<b>Total</b>		£2,285.93**

For any request over £200 please provide further justification for all items that contribute to a high total cost estimate. Please also provide justification if costing for an honorarium:

### Appendix 2.13: Research Proposal

Please note that this project is a joint project and so the costs will be shared jointly between two trainees. The estimated budget is therefore £1142.96 per trainee. The cost of the project is above the £200 budget per trainee. This is due to the high costs of neuropsychological assessment tests; namely, the Word Memory test, the Symbol Digit Modalities test and the Hayling Sentence Completion test. Travel to the five prisons has also increased the estimated costs of the project (however, it should be noted that travel within the GG&C area – to HMP Greenock – will be covered by the GG&C NHS healthboard). The high costs of this project are unavoidable due to the need to recruit a significant sample size to be representative. Professor McMillan, the project supervisor, has received funding for projects on head injury in prisoners which will cover most of the costs of this study. **It is envisaged that the DClInPsy programme will cover the first £250 of research costs for each project and that Prof. McMillan's head injury research funding will cover the remaining costs.**

Trainee Signature..... Date.....

Supervisor's Signature ..... Date .....

## Appendix 2.13: Research Proposal

**APPENDIX D2- WEST OF SCOTLAND/ UNIVERSITY OF GLASGOW  
DOCTORATE IN CLINICAL PSYCHOLOGY****HEALTH AND SAFETY FOR RESEARCHERS**

1. Title of Project	The epidemiology of head injury in women prisoners
2. Trainee	XXX (anonymised)
3. University Supervisor	Prof. Tom McMillan
4. Other Supervisor(s)	n/a
5. Local Lead Clinician	n/a
6. Participants: (age, group or sub-group, pre- or post-treatment, etc)	Women in Scottish prisons with and without head injury, over the age of 16 years.
7. Procedures to be applied  (eg, questionnaire, interview, etc)	<p>Participants will be asked to engage in one research session lasting approximately 45 – 60 minutes in length. During this, they will be asked to complete self-report questionnaires and neuropsychological testing, as outlined below:</p> <ul style="list-style-type: none"> <li>• <i>Ohio State University Traumatic Brain Injury Identification Method (OSU TBI-ID; Corrigan &amp; Bogner, 2007)</i></li> <li>• <i>Rivermead Post-Concussion Questionnaire</i> (King, Crawford, Wenden, Moss, &amp; Wade, 1995)</li> <li>• <i>Glasgow Outcome at Discharge Scale</i> (McMillan et al)</li> <li>• <i>Dysexecutive Questionnaire</i> (Wilson et al., 1996)</li> <li>• <i>Symbol Digit Modalities Test</i> (Smith, 2013)</li> <li>• <i>Rey Auditory Learning Test</i> (Rey, 1964)</li> <li>• <i>Trail Making Test</i> (Reitan, 1992):</li> <li>• <i>Benton's Verbal Fluency Test</i> (Lezak, 1995)</li> <li>• <i>The Hospital Anxiety and Depression Scale</i> (Zigmond &amp; Snaith, 1983)</li> <li>• <i>Alcohol Use Disorders Identification Test</i> (AUDIT; WHO)</li> <li>• <i>Drug Abuse Screening Tool</i> (DAST-10; Skinner, 1982)</li> <li>• <i>Word Memory Test</i> (Green, Allen &amp; Astner, 1996)</li> <li>• <i>Traumatic Life Events Questionnaire</i> (Kubany et al 2000)</li> <li>• <i>Demographic questionnaire</i> covering: Age, ethnic origin, disability, level of education, postcode prior to incarceration (to calculate socioeconomic status), employment status prior to prison, number of convictions, type of offence (violent/non violent) and estimated total time in prison.</li> </ul>

## Appendix 2.13: Research Proposal

8. Setting (where will procedures be carried out?)	Recruitment of female prisoners/procedures will be carried out at the following prisons:
i) Details of all settings	<ul style="list-style-type: none"> <li>• Stirling (Cornton Vale)</li> <li>• Greenock</li> <li>• Polmont</li> <li>• Edinburgh</li> <li>• Grampian</li> </ul> <p>Procedures will take place in NHS clinic areas/rooms of the above prisons. Prison personnel will staff these rooms at all times.</p>
ii) Are home visits involved	No
9. Potential Risk Factors Considered (for researcher and participant safety):	i) <b><u>Participants</u></b> -Participants are women in prison in Scotland, over the age of 16 years
i) Participants	a. The prison population, by its nature, includes individuals who may be at risk of violence to others due to being convicted of violent crimes and the potential to be under the influence of substances. The researcher may be at risk of aggressive and unpredictable behaviour.
ii) Procedures	b. Participants may have a cognitive impairment, mental health problem or literacy difficulty that could mean they are unable to provide informed consent.
iii) Settings	c. This project will be looking at trauma (domestic violence and childhood abuse) in women in prison. Consequently this population may have experienced abuse from someone in a position of power and may be more likely to consent to research or be reluctant to withdraw.
	d. Discussing traumatic experiences may cause distress in participants.
	e. There is a risk that some participants may feel pressured into taking part in the study in order to illustrate 'good behaviour'.
	ii) <b><u>Procedures</u></b> : Participants will be asked to complete a range of questionnaires and neuropsychological assessments. Medical records will also be accessed to get information on hospitalised head injuries and previous diagnoses of physical and mental health problems.
	a. the main risks in relation to participants are (1) psychological distress or re-traumatising;

## Appendix 2.13: Research Proposal

(2) fatigue; and (3) uncovering risk or unmet need (eg. suicidality or a severe neurological condition)

- b. the main procedural risks in relation to researchers are in relation to risk of aggression from participants (as described above) and also risk of aggression from non-participants during movement through the prison.

Settings: As outlined above, procedures will be undertaken in 5 Scottish prisons. Prisons are likely to contain individuals who are high-risk in terms of aggression and unpredictable and violent behaviour.

### 10.. 10. Actions to minimise risk (refer to 9)

- i) Participants
- ii) Procedures
- iii) Settings

#### i) Participants

- a. Prison safety protocols will be followed at all times to ensure the safety of the researcher and participant. The researcher will attend mandatory prison safety induction courses run by the Scottish Prison Service (SPS).
- b. Individuals' ability to give informed consent will be assessed with support from NHS and prison staff guidance, as well as their ability to understand and provide consent when going through the participant information sheet and consent form. Information will be provided in an easy read format and will be discussed verbally to account for the possible cognitive impairment in this population. Those unable to give informed consent will not be included in the study.
- c. The risk of participants feeling coerced to take part in the research will be minimised by emphasising to all potential participants that their involvement is entirely voluntary: they may choose to discontinue the research at any time and taking/not taking part will not affect their treatment in prison or prison record in any way. This will be emphasised through the posters, participant information sheet, consent form and verbally during the session.
- d. Participants will be reminded that they can take a break or withdraw from the study at any time. Researchers will manage distress using clinical skills gained during the clinical psychology doctorate training process. Support will also be sought where necessary/appropriate from the NHS or prison staff and the project supervisor. Measures related to trauma have been chosen specifically because they do not ask participants to go into extensive detail regarding traumatic experiences, instead measures have binary yes/no responses which prevents the risk of reliving the trauma.



## Appendix 2.13: Research Proposal

- e. As described in part (c) , it will be emphasised to the participants that the researchers are not members of prison staff and that participation will not affect prison records unless they were to disclose imminent significant levels of risk of harm to themselves or others.
- f. The researcher will follow prison safety procedures at all times and attend additional SPS training events. During procedures, clinic/interview rooms will be staffed by prison personnel at all times. The researcher will also wear a panic alarm at all times during prison visits/procedures. Prisoners currently in segregation will not be included in the study due to the risk to the researcher.

ii) **Procedures :**

- a. To reduce participant burden, research sessions will be kept to a minimum (1 hour max), and only information necessary to answer the research hypotheses will be gathered. Participants will be encouraged to take breaks if they feel fatigued or distressed. Researchers will use clinical skills to assess and offer breaks should it be evident that the participant is fatigued, frustrated or distressed.
- b. Should the participant report that they are significant risk of harm to themselves or others then this will be reported to NHS staff on site, and where necessary support will be sought from the project supervisor. Confidentiality will be explained verbally and via the participant information and consent form, and this consent will be sought prior to the study.

- iii) **Settings –** As discussed above, the researchers will follow SPS policy and procedure at all times to maintain safety of themselves and others. The will also attend prison safety courses and induction to ensure they adhere to policy. Prison staff will be present at all times to ensure that the researcher is not alone with prisoners and maintain their safety.

Submissions will be made to the Scottish Prison Service and the NHS Research Ethics Committees.

Trainee signature: .....Date: .....

University supervisor  
signature: .....Date: .....